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DE BEERS CONSOLIDATED MINES, LIMITED.

Capital £3,950,000.

SECOND ANNUAL REPORT

For the Year ending 31st March, 1890.

Life Governors :

| | |
|--|-----------------------------------|
| HON. CECIL JOHN RHODES, M.L.A. | B. I. BARNATO, Esq. M.L.A. |
| F. S. P. STOW, Esq. | ALFRED BEIT, Esq. |
| ROCHFORT MAGUIRE, Esq., M.P., (Alternate). | MAX MICHAELIS, Esq., (Alternate). |

Chairman : HON. CECIL JOHN RHODES, M.L.A.

Deputy Chairman : HENRY ROBINOW, Esq., J.P.

Directors :

| | |
|-----------------------------------|-----------------------------------|
| CHARLES E. ATKINSON, Esq. | JOHN MORROGH, Esq., M.P. |
| FRANCIS BARING-GOULD, Esq. | HARRY MOSENTHAL, Esq. |
| GEORGE WM. COMPTON, Esq. | CHARLES E. NIÑD, Esq. |
| SIR DONALD CURRIE, K.C.M.G., M.P. | FRANCIS OATS, Esq. |
| ROBERT ENGLISH, Esq. | THE RIGHT HON. SIR HERCULES G. R. |
| RUDOLF HINRICHSEN, Esq. | ROBINSON, P.C., G.C.M.G. |
| WOOLF JOEL, Esq. | HENRY ROBINOW, Esq., J.P. |
| CARL MEYER, Esq. | THOMAS SHIELS, Esq. |
| | JULIUS WERNHER, Esq. |

General Manager : GARDNER F. WILLIAMS, Esq.

Secretary : WILLIAM HENRY CRAVEN, Esq.

Accountant : WILLIAM PICKERING, Esq.

Secretary London Transfer Office : E. R. TYMMS, Esq.

Solicitors :

MESSRS. CALDECOTT & BELL, KIMBERLEY.
MESSRS. HOLLAMS, SONS, COWARD & HAWKSLEY, LONDON.

Bankers :

CAPE OF GOOD HOPE BANK, KIMBERLEY & LONDON.
LONDON & WESTMINSTER BANK, LOTHBURY, LONDON.

Head Office : KIMBERLEY, GRIQUALAND WEST, SOUTH AFRICA.

London Transfer Office : 62, LOMBARD STREET, E.C.

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1890 second annual
REPORT 22 plates

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REPORT OF THE DIRECTORS

OF THE

De Beers Consolidated Mines, Limited,

FOR THE

YEAR ENDING 31ST MARCH, 1890.

GENTLEMEN,

Your Directors in submitting their Second Annual Report for the information of the Shareholders have to announce that the object with which the Company was originally started has at last been accomplished, and the four Diamond producing Mines of De Beers, Kimberley, Du Toit's Pan and Bultfontein are now practically under the control of the Company.

Following the practice adopted by the De Beers Mining Company and carried out in their last Report, your Directors now submit the following synopsis of the year's work.

The Balance Sheet and Statement of Profit and Loss now submitted show a balance (after payment of two Dividends of ten per cent. each, amounting together to £789,682) of £465,416 1s. 3d.

During the year 2,192,226 loads of Blue Ground have been hauled from the De Beers and Kimberley Mines and 859,262 loads from Du Toit's Pan and Bultfontein, and the stock of Blue Ground on Floors at the 31st March, 1890, consisted of 1,576,821 loads at De Beers and Kimberley and 1,334,155 loads at Du Toit's Pan and Bultfontein, this latter including the loads taken over from the various Companies purchased during the year.

During the same period 1,325,400 loads of Blue have been washed at De Beers and Kimberley and 625,700 loads at Du Toit's Pan and Bultfontein, yielding in the aggregate 1,608,830 carats of Diamonds which realised

| | | | |
|--|------------|----|---|
| ... ... ... ... ... ... | £2,641,557 | 19 | 3 |
| ... ... ... ... ... ... | 1,431,777 | 17 | 1 |

The working expenses of the four Mines amounted to

| | | |
|------------|---|---|
| £1,209,780 | 2 | 2 |
|------------|---|---|

Leaving a profit on the actual working of

| | | |
|------------|---|---|
| £1,209,780 | 2 | 2 |
|------------|---|---|

The Profit and Loss Account stands thus :—

| | | | | |
|---|--|------------|----|---|
| Balance as above | ... ... ... ... ... ... | £1,209,780 | 2 | 2 |
| Increase of Blue Ground (being actual cost of placing the Blue on the Floors) | ... ... ... ... ... ... | 298,889 | 18 | 0 |
| Dividends on Investments and other Receipts | ... ... ... ... ... ... | 26,761 | 16 | 4 |
| Balance from last year | ... ... ... ... ... ... | 322,431 | 4 | 4 |

| | | |
|------------|---|----|
| £1,857,863 | 0 | 10 |
|------------|---|----|

Which has been applied as follows :—

| | | | | |
|---|--|----------|----|---|
| Payments of Dividends | ... ... ... ... ... ... | £789,682 | 0 | 0 |
| Commission, and cost of Second Debentures | ... ... ... ... ... ... | 72,282 | 13 | 4 |
| Expenses Paris Exhibition and sundry small accounts written off | ... ... ... ... ... ... | 2,482 | 6 | 3 |
| Balance of Profit and Loss brought forward from last year, which, being invested in the purchase of property, is not available for distribution, and is therefore now written off | ... ... ... ... ... ... | 322,431 | 4 | 4 |

| | | |
|---------|---|---|
| 322,431 | 4 | 4 |
|---------|---|---|

| | | | | |
|---|--|------------|----|----|
| Further amount written off Machinery and Plant, Shafts, and Development Works, &c., out of the profits of the current year, not being available for distribution, including amount estimated for depreciation | ... ... ... ... ... ... | 205,568 | 15 | 8 |
| Carrying forward for the year a balance of | ... ... ... ... ... ... | £1,392,446 | 19 | 7 |
| | | 465,416 | 1 | 3 |
| | | £1,857,863 | 0 | 10 |

| | | |
|--|-----|-----------------------|
| The average yield per load for De Beers and Kimberley is | ... | 1.09 carats. |
| Ditto value per carat ... | ... | £1 12 6 $\frac{3}{4}$ |
| Ditto value per load ... | ... | 1 15 7 $\frac{1}{2}$ |

AMALGAMATION AND INVESTMENTS.

Referring again to the subject touched upon in the first paragraph of this Report, your Directors now propose to state shortly for the information of Shareholders the various purchases and amalgamations that have been carried through during the past financial year.

In the Balance Sheet for the year ended 31st March, 1889, the Company's interest in the Kimberley Mine was represented by 176,592 Shares in the Kimberley Central Diamond Mining Company and Debentures of that Company to the amount of £500,000.

Since then, as stated at the last Annual Meeting, the Kimberley Mine has been purchased by this Company.

Besides the purchase of the Kimberley Mine, above referred to, your Directors have bought the following properties in the Du Toit's Pan Mine:—

The Anglo-African Diamond Mining Company,
The Compagnie Générale (including their interest in the Conivieras Mines in the Brazils)
The Sultan Diamond Mining Company,
The United Diamond Mining Company,
And they have entered into a permanent working agreement by which they have the practical possession of the Griqualand West Diamond Mining Company.

In the Bultfontein Mine they have purchased:—

The Bultfontein Mining Company,
The Spes Bona Diamond Mining Company,
The South African Diamond Mining Company,
And have entered into an agreement with the Consolidated Company, Bultfontein Mine, similar to that with the Griqualand West Diamond Mining Company of Du Toit's Pan Mine.

The total purchase price of these Companies amounts to ... about £2,564,000
Besides which, payments were made in Cash for Sundry Investments, Conversion of Kimberley Central Shares, Transfer Fees and Stamps, Cost of Liquidation of Kimberley Central Company 211,210

For British South Africa Company Shares 91,000
" Commission, and Charges raising Second Debentures, &c. 81,300
" Cost of placing Blue on the Floors 298,890

Making in all a total of 2,346,400

To meet this outlay Second Debentures £1,750,000 were created at issue price 1,660,000

De Beers Bultfontein Obligations (given in purchase of the Bultfontein Mining Company) 745,400

And 146,464 Shares in the Consolidated Company of Bultfontein Mine held by this Company, which were given in exchange to some of the purchased Companies at the rate of 156,000

£2,561,400

Leaving a balance paid out of Profits for the year of about £685,000

WORKING OF THE MINES.

The General Manager's Report on the above subject is annexed hereto.

CECIL J. RHODES,
HENRY ROBINOW,
G. W. COMPTON,
C. E. NIND,
MAX. MICHAELIS. } Directors.

GENERAL MANAGER'S REPORT.

To the Directors of De Beers Consolidated Mines, Limited.

GENTLEMEN,—

I have the honour to submit the following as my Second Annual Report.

Since my last report was laid before you the whole of the Kimberly Mine and nearly all of the Du Toit's Pan and Bultfontein Mines have been acquired by this Company.

A short description of each mine, and a summary of the work done at the same, is given below.

Having been frequently importuned by various technical societies as well as by individuals to give a Report on the technical working of the Diamond Mines, I have thought it best to add a short Report of this kind.

I have had drawings prepared in the Surveyors' Department which illustrate the Mines and the machinery employed in winning the diamonds.

DE BEERS MINE.

It may be well to give a description of the Mine, with its various shafts and outlets, for the benefit of those who have not seen the last Report.

No. 2 INCLINE (UPCAST).

This shaft is situated on the West side of the Mine. It is inclined 56 deg. 20 min. from the horizon. It is divided into four compartments one with double ladders, by means of which the natives go to and from the mine, another is used for the cage or trolley to carry the white miners to and from their work, and the remaining compartments are used for hoisting blue or diamond-bearing ground.

The quantity of ground hoisted through the shaft during the year amounted to 1,355,089 loads of 16 cubic feet, or 1,084,071 tons of 2,000 lbs.

ROCK SHAFT (DOWNCAST).

This Shaft is situated 541 feet from the margin of the Mine on the North Side. It has four compartments consisting of a pump-way $5\frac{1}{2}$ feet x 6 feet., a compartment with a double-decked cage 4 feet 4 in. x 6 feet, and two skip-ways 4 feet 4 in. x 6 feet each. Since my last Report the Cornish pumping plant has been completed, and the erection of the new hoisting engines is nearly finished.

ORIENTAL SHAFT (UPCAST).

This Shaft is situated on the East Side of the Mine, and serves for ventilating the East part of the same. When first opened it was a downcast, but since the upper levels have been connected with the Rock Shaft it has changed to an upcast.

Besides the Shafts mentioned above there is a Vertical Escape Shaft (downcast) which has a ladder and cage compartments and is connected with seven levels in the Mine. It was sunk through blue ground from one of the terraces on the West side of the open Mine.

For a description of the method of working the Mine I beg to refer to the technical part of the Report.

WATER.

The quantity of water has decreased very much during the year. In my last Annual Report I gave the quantity of water from the 800 feet level as 7,000 gallons an hour, and about 4,000 gallons from the levels above. At the present time the total quantity of water is 5,700 gallons per hour.

NEW HOISTING PLANT.

The new Hoisting Plant at the Rock Shaft consists of an engine with two cylinders 24 in. x 60 in., an iron pithead frame 61 feet in height, with three sheaves 14 feet in diameter on tred. The ground is to be hoisted in skips, which are made to tip automatically as shown on plate 11. The skips hold five loads, or 80 cubic feet. The output from the Shaft will be about 4,000 loads a shift of ten hours.

COST OF MINING.

The Cost of Mining averaged 5s. 0½d. per load, which includes all expenses until the blue ground is placed upon the Floors.

QUANTITY OF BLUE GROUND DEVELOPED.

In my last Report I estimated the number of loads of blue ground in sight at 6,205,000 loads, and, as after making allowance for the quantity hauled during the year, 1,410,578 loads, we still have about 4,800,000 loads in sight and ready to be hauled, equal to four years' work, there has been no need to make any further developments, but I propose during the ensuing year to begin sinking the main shaft for the purpose of opening up another level 200 feet deeper, which will give us another 5,000,000 loads. This development work will be repeated from time to time, so as always to have several years' supply of blue ground actually in sight. The number of loads of blue hoisted during the year is as follows:—From the 700 feet level and levels above through No. 2 incline 1,355,089 loads, and from levels between the 700 feet and 800 feet in course of development there were hoisted through the Rock Shaft 55,489 loads.

DEVELOPMENT WORK.

The following work has been done during the year:—Tunnels driven, 7,809 feet; tunnels repaired, 1,839 feet; passes sunk, 774 feet. The tunnels on the 800 feet level have been completed and those on the intermediate levels are well advanced. We have at the present time four years' supply of blue in sight, and can add five years more by sinking shafts in the blue ground 200 feet below the 800 feet level. A test of the west end blue was made from the ground taken from the main tunnel. 4,708 loads were placed upon the floors, and when pulverised were washed and yielded 571 carats. I am given to understand that this part of the mine gave about the same yield near the surface, consequently no improvement has taken place in depth.

MECHANICAL HAULAGE.

This has been extended during the year so that the total length of the main lines is now 5½ miles.

The cost of hauling and depositing blue for the year averages 7½ pence per load. This includes all cost for labour, lights, &c., from the time the blue is tipped into the box at the mine until it is put on the floors. The cost of depositing before the haulage was completed was 7½d. per load. No floor was then more than a mile from the mine nor did the 7½d. include cost of filling trucks at mine nor the cost of maintenance of roads, lights, grease, &c. The average distance of the present depositing floors is more than double that of former years.

FLOORS.

At the end of last year we had 476,403 loads of blue ground and 77,137 loads of cylinder lumps on the floors. The increase during the year has been 572,986 loads of blue and 27,125 loads of lumps, making 1,049,389 loads of blue and 104,262 loads of lumps on the floors at the end of the year. This ground covers an area of nearly 600 acres.

The new washing machines mentioned in my last report as being necessary to wash the blue deposited on the new floors have been commenced and will be running about the end of July.

The quantity of ground washed during the year was 837,592 loads at a cost of 3s. 5½d. per load, including 128,707 loads of cylinder lumps.

The floors are now fenced with a seven-foot barbed wire fence which is a preventive against theft by outside or unemployed persons.

WATER SUPPLY.

A large part of the water used on the floors has been pumped from the mine and from the reservoir on Kenilworth. The system of pumping water from wells on the floors has been somewhat neglected since the river water was laid on.

I have caused more economical pumping machinery to be erected at two of the wells which are now supplying water for all the boilers on the floors, and will supply those at the mine as well.

The cost of pumping from the wells does not exceed 1d. per hundred gallons. I intend to place electric motors at these wells for driving the pumps.

PULSATOR.

The deposit from all the washing machines both at De Beers and Kimberley is now passed through the pulsator at De Beers and assorted there.

CONVICT LABOUR.

Mention was made in my last report of the proposed increase of the number of convict labourers. At that time about 300 were employed. The number has since been increased to 650. The increase in number has made it necessary to provide more accommodation. This is being done by removing the large iron building from the old floor compound. It was no longer needed in its former position as all the natives had been removed to the stable Compound.

The average cost of convicts was £28 during last year. This includes all cost for guards, food and clothing, also medical attendance.

This cost is very small when we take into consideration that a long sentenced convict who has become accustomed to the work will do double the amount of work that the ordinary free boy will do, who receives 18s. to 20s. per week.

NEW STABLES.

These have been completed, and have connected with them a compound for drivers and all free boys employed on the floors. The stables have a capacity for 300 horses and mules. The closing of this compound placed all native labourers employed by the Company under the restraint of the compound system and put an end to much illicit traffic in diamonds.

YIELD OF BLUE GROUND.

It will be noticed that the yield of the blue ground is not as high as during last year.

The reason for this is two-fold.

1st. During former years the centre or better part of the mine had been worked down in advance to that part lying next to the rock, leaving a block of ground several hundred feet high around the rock on the south and east sides.

2nd. It became apparent to me that it would be impossible to mine in depth unless a change was made in the manner of working. In my judgment it was necessary to work out that part of the mine lying next to the rock in advance of the centre of the mine.

In making the change in the system of working we have of necessity been obliged to take out blue ground of an inferior quality which was too good to throw away, and almost too poor to send to the floors and mix with the better blue. We shall have about the same yield during the next year, owing to the quantity of poor ground on the floors, but after that the blue ground will assume its normal value of about $1\frac{1}{4}$ carats per load.

The new system has received favourable mention from several prominent Mining Engineers who have inspected the mine.

COST OF WORKING.

The average cost of winning and washing is 8s. $5\frac{1}{2}$ d. per load, which is 1s. 5d. less than

during the previous year. The cost of washing is too high, but it must be borne in mind that to the ordinary expenses of washing has been added the cost of preparing new floors to receive the increase of 600,000 loads of blue and lumps. This increase exceeds the total quantity on the floors at the end of last year by 46,571 loads.

I may add here that the cost of washing at De Beers will always be in excess of the cost at Kimberley on account of the large proportion of hard blue mixed through it, which necessitates extra handling.

THE RAIN-FALL.

We have had an exceptionally good season. The quantity of rain was 24.554 inches, pretty well distributed through the summer months.

STEAM TRAM.

Owing to the extent of the floors, it is necessary to have some means for transporting the labourers to and from their work. The steam tram recently used by the Bultfontein Mining Company has been taken up for this purpose and will be relaid on the De Beers floors.

KIMBERLEY MINE.

This property came into our possession the 1st of June, 1889.

It will be remembered that a general collapse of the underground works took place several months before the formal transfer was made to this Company. I was placed in charge of the property just after the collapse. I caused a tunnel to be started in the hard rock with the object of opening up the east side of the mine. Before it was completed I found that it would be impossible to maintain sufficient tunnels in the blue ground to give us a reasonable output. The rock tunnel was in consequence continued around the south side of the mine. It is about 15 feet from the blue. From it offsets were driven into the mine. By means of this rock tunnel the output was increased until it averaged over 4,000 loads a day.

THE EAST, OR STANDARD SHAFT (UPCAST).

This shaft is inclined 32 degrees from the horizon from the surface to a depth of 700 feet (on the incline). Thence it is vertical for about 500 feet. It has two skip-ways and a very narrow ladder-way. The quantity of blue ground hoisted through it during the year was 396,789 loads.

ATKINS SHAFT (DOWNCAST)

Is situate on the very edge of the present open mine. It is a vertical shaft and extends from the surface to the 525 feet level. It is connected with the Harvey Shaft by means of a tunnel in the hard rock. This latter shaft extended from the 525 feet to the 725 feet level. It is situate near the edge of the hard rock in the open mine. After taking charge, I caused it to be opened from the top of the hard rock down to the 525 feet level.

A pithead frame was constructed and several wire ropes were taken into the Mine to work Machinery. Two attached to cages hoisted the blue ground to the 525 feet level, thence it was hoisted to the surface through the Atkins shaft. Other two ropes worked a cage and water tank in the prospect shaft or winze, by means of which the four levels below the 725 feet level have been developed. The pump was driven by an endless rope driven from the surface. On the 14th day of March a heavy fall of reef carried away the head-gear and filled the shaft from top to bottom with *debris*. In three weeks' time the shaft was again opened from the 525 feet level to the 725 feet level and work in the Mine was resumed. This shaft has been of great service to us, for we have hoisted 384,859 loads, or nearly one-half of the whole output for the year, through it, and the loss of the head-gear, etc., mentioned above, is infinitely small compared with the value of the blue ground hoisted.

KENDRICK SHAFT (DOWNCAST).

This shaft has three large compartments. It extends down to the hard rock and is connected with the Atkins shaft by a well-timbered tunnel 360 feet long, driven through the shale.

(NOTE.—Since the close of our year, that is from April 30th to June 19th, reef movements have taken place which threatened the destruction of the Atkins shaft. To avoid taking any risk of this shaft being filled, I caused a pent-house to be put in at a point twenty feet above the hard rock. The main road for men to and from the mine is down the Kendrick shaft, thence to the Atkins shaft, down the Atkins shaft from 280 feet level to 525 feet level, thence to Harvey shaft and down the latter to the mine.)

ROCK SHAFT.

During the month of March, 1889, a new outside shaft situate on the north side of the Mine and about 1,134 feet therefrom, was started. It is of the same dimensions as the De Beers' Rock shaft, with the exception of the pump compartment, which is 6 feet x 6 feet, instead of 5 feet 6 inches x 6 feet. It was 60 feet deep on March 31st, 1889. It has been sunk 699 feet during the year and at the time of the writing of this Report (July, 1890), has reached a depth of 964 feet 6 inches. When the shaft has reached a depth of 1,000 feet, a tunnel will be driven into the Mine. For the relative position and thickness of the various rocks passed through in sinking the shaft, reference is made to Plate 6.

MACHINERY FOR THE ROCK SHAFT.

A Cornish pumping plant is now being constructed by Messrs. Simpson & Co., of Pimlico, London. It consists of a triple expansion vertical engine of 400 horse-power. The pumps are 14 inches in diameter and 10 feet stroke. A winding engine will be ordered shortly. It will consist of two tandem compound vertical engines with 12 feet drum. A full description of this Plant will be given in the next Annual Report.

SYSTEM OF WORKING THE MINE.

During the past year work has been carried on without any regular system owing to the mine above the 725 feet level being in a crushed state. The new levels below the 725 feet have been laid out on a plan similar to that of De Beers. These will be opened up on the south side of the Mine and worked back from the rock in terraces.

DEVELOPMENT WORK DONE DURING THE YEAR.

| | | | | | | |
|--------------------|-----|-----|-----|-----|-----|----------------|
| Tunnels and Passes | ... | ... | ... | ... | ... | 9,144 feet. |
| Rock Tunnels | ... | ... | ... | ... | ... | 757 " |
| Rock Shaft | ... | ... | ... | ... | ... | 699 " |
| Prospect Shaft | ... | ... | ... | ... | ... | 44 " 6 inches. |
| Standard Shaft | ... | ... | ... | ... | ... | 95 " 6 " |
| Harvey Shaft | ... | ... | ... | ... | ... | 60 " |

The cost of mining which includes 6 $\frac{7}{10}$ pence for depositing is 6s. 8 $\frac{1}{2}$ d. per load. When we consider the great difficulties under which this has been mined the cost is not excessive.

ELECTRIC LIGHT.

The underground works will be lighted by electricity from a dynamo to be erected at the mine. Arrangements are being made to light the floors, the compounds, and the surface works at the mine with Arc Lamps supplied from the main station in De Beers.

WATER IN THE MINE.

Since the underground works were opened there has been a much larger influx of water at Kimberley than at De Beers. This is rather remarkable because the area of De Beers Mine is double that of Kimberley. The amount pumped at the present time is about 12,000 gallons an hour. Since the Harvey Shaft was filled the water has been pumped by means of a geared steam pump from the 725 feet level to the Kendrick tunnel and hoisted in tanks from this level to the surface. The steam is taken from boilers on the surface down the East Shaft.

RAILWAY SIDING.

A siding is being constructed from the Railway Station to the mine, a distance of little over

one mile. When completed it will make a difference of 2s. a ton on coal and other supplies delivered in car load lots.

COMPOUNDS.

A new Compound has been constructed for natives working on the floors. The Mine Compound has been re-constructed and enlarged at considerable expense. A securely enclosed way leading from the Compound to the Kendrick and East Shafts has been built, so that the natives working in the mine are kept entirely separate from those on the surface. The result of the change is a much smaller loss of diamonds by theft, which will soon repay the expense incurred. The Kimberley Mine Compound is now the most perfectly-arranged Compound on the Fields. An Hospital for natives will be added next year.

FLOORS.

The quantity of blue ground on the floors when we bought the mine was 159,437 loads and 32,387 loads of lumps, which has increased to 527,432 loads of blue and 80,600 loads of lumps at the end of the year. An additional area of 192 acres has been added to the floors. There are six washing machines at work, and two (the old Standard) machines are being moved to the north side of the new floors. Cost of washing was 2s. 6 $\frac{3}{4}$ d. per load.

SYSTEM OF HAULING.

The blue ground is conveyed to the south side of the floors by means of an endless chain haulage. From the lower end of the haulage locomotives take the trucks to the various floors where the blue ground is deposited. The cost of depositing averages 6 $\frac{7}{10}$ pence per load.

DU TOIT'S PAN MINE.

Large falls of reef had taken place in various parts of the mine before we took possession of the several properties now under our control. Work in the mine was carried on for a time but it soon became evident that no profit could be made by working, and the continuation of work would indirectly have caused a great loss to us. If we had an unlimited demand for diamonds we could then work these mines so long as they paid expenses. As there was only a limited demand for diamonds it was decided to discontinue work for the present. We took over from various Companies 741,677 loads of blue, to which we added 397,184 loads from the mine. We washed 271,026 loads. The balance remaining on the floors at the end of the year was 868,835 loads. Plate No. 24 shows the plan of this mine and the Company's holdings therein.

BULTFONTEIN MINE.

By reference to Plate 25 it will be seen that the whole of this mine, with the exception of a few small Companies which are not being worked, belongs to the De Beers Company. We took over 357,916 loads of blue with the various Companies, and hoisted on our own account 462,078 and washed 354,674. There remained unwashed at the end of the year 465,320 loads. Owing to a very large fall of reef which covered nearly the entire area of the bottom of the mine, profitable work in the open became impossible except over a very small area. It was our intention to have sunk two shafts and started underground work, not because there would have been any profit to the Company but rather to give employment to a large number of men who were dependent upon the Company for work. Owing, however, to obstacles thrown in the way of starting shafts by our Landlords (the London & South African Exploration Company, Ltd.), we found it necessary to discontinue negotiations and stop work.

KENILWORTH.

We have completed 24 houses for families and quarters for 48 single men. A very excellent Club-house has been built, which includes, besides the mess-room and kitchen, a Reading Room where many of the Weekly and Monthly papers and Magazines are kept, and also 600 volumes from the Kimberley Public Library. There is also a Billiard Room with two very good tables the gifts of two of our Life Governors, to whom our employés feel very grateful.

Tree-planting has been carried on to a considerable extent in the vicinity of the village. These include eucalyptus, cypress, pines, beef-wood, oaks and a variety of fruit trees.

In conclusion I desire to say that the various Heads of Departments, with scarcely an exception, have rendered us good service during the year. The work of some of these men has been very trying owing to the condition of the Mines, more especially the Kimberley Mine. These difficulties have, to a certain extent, been overcome and will be fully remedied when the Rock Shafts at both Mines are completed.

Yours Faithfully,

GARDNER F. WILLIAMS, General Manager.

TECHNICAL REPORT.

Frequent requests having been made for a technical report, by various scientific societies as well as by many individuals interested in the success of the diamond industry it has been deemed advisable to add to the general report a short description of the occurrence of the diamond mines and the method of winning the diamonds and to give a few plates delineating the mechanical appliances appurtenant thereto. Time and space prevent any minute description. It will, however, serve the purposes of this report if a general idea of the method of winning the diamonds is conveyed to the mind of the reader.

GEOGRAPHICAL POSITION OF THE MINES.

The mines are situate at Kimberley in latitude 28 degrees 42 minutes 54 sec. south, and longitude 24 degrees 46 min. east. The height above the sea is 4,042 feet. The average readings of the Barometer are 26.2 inches.

FORMATION OF THE MINES.

The mines are evidently the result of the filling of extinct craters with volcanic mud from below.

All the evidence we have points to this formation.

The shales which surround the "blue" or diamond-bearing ground were turned upward showing that the force was from below.

The boulders which are found in the blue are of the same composition as the rocks which surround the blue.

It is a most remarkable fact, however, that nature when filling these craters, filled them just level with the surface or a few feet above same.

There does not appear to have been any overflow, otherwise the surface of the country in the neighbourhood of the mines would have been covered with diamonds.

It is also apparent that the mines were not filled with the same material at one and the same time. Each mine has its distinctive characteristics and even in the same mine all the blue does not seem to have been deposited at one time. Take for example the striking fact that in both De Beers and Kimberley mines the west side blue ground is wholly unlike the other portions of the mines and carries very few diamonds, and these are unlike the diamonds in the other portions of the mines.

The diamond-bearing ground near the surface was of a light yellow colour, the result of the oxydation of the various minerals of which it is composed.

By reference to Plates 3, 4 and 22, which give sectional views of the De Beers and Kimberley mines, it will be observed that the rocks surrounding the blue ground change in depth. Plate 6 gives the Geological Sections of the Rock Shafts at the two mines.

The surface of the country is covered with red soil from one to five feet in depth, underlying which is a much decomposed basalt from twenty to ninety feet thick. Below the basalt is black slate or shale which contains besides a considerable amount of carbon, a large quantity of iron pyrites. The shale ignites spontaneously and burns in the open mine and on the reef tips.

It was lately suggested by a distinguished French Engineer, that this burning shale might become a menace to the system of underground mining. No danger from this source exists at the present time.

A close observation of the Kimberley Mine will show, first, that the fire in the shale has nearly died out, and second, that even if it continued to burn, the fumes could not enter the underground works, as the downcast shaft is situate on the surface of the ground many hundreds of feet distant from the burning shale and at a much higher elevation. No trace of the fumes from the shale burning in the open mine is noticeable underground.

No burning shale exists in the De Beers Mine. It can be taken for granted that no trouble will happen from this source. The thickness of the shale is from two hundred to two hundred-and-

fifty feet. Underlying the shales is a bed of conglomerate composed of small and large stones, well rounded and firmly cemented together. The rock shaft at the Kimberley Mine passed through about ten feet of this conglomerate.

Below the conglomerate is a very hard amygdaloidal rock, called by M. Moule "Melaphyre," which has lately been determined by Dr. Stelzner, Professor of Geology at the Freiberg School of Mines, as "Olivine Diabase" which is virtually composed of the same minerals Plagioclase, Augit and Olivine, the one being granular the other porphyritic—(Geikie). It is about four hundred feet in thickness, and is very hard. In shaft work the average distance sunk is from eight to ten feet per week.

Underlying the Amygdaloidal rock is quartzite, the thickness of which is not yet determined. The Kimberley Rock shaft has passed through two hundred-and-fifty feet of it and the bottom of the shaft is still in it.

INCLINATION OF THE STRATA.

All the rocks surrounding the pipes of blue ground lie nearly horizontal, but dip slightly to the north.

THE SNAKE.

In the De Beers Mine there is a dyke of igneous rock extending from the south-east part of the mine around the east and north sides, and is lost in the unexplored poor blue of the west end. Owing to its taking a serpentine course across the mine it has received the local name of "Snake." This rock has been determined to be a Pikrite-porphry (Stelzner), consisting of a much decomposed mass wherein numerous little Olivine crystals and mica splints are imbedded. The snake commences at or near the surface, and extends down to the lowest workings. It does not adhere to the blue ground but separates from it very easily. It stands like a vein, nearly vertical, varying in thickness from two to seven feet. No diamonds have been found in it.

THE ISLAND.

There is a large mass of country rock in De Beers Mine, which in the upper levels covered several claims, say an area of 3,000 square feet. It has been exposed to a depth of 710 feet, and probably extends to a greater depth, although it has not yet been exposed on the deeper levels.

It is an Olivine Diabase and is the same as the amygdaloidal rock, except that it is filled with numerous veins of Zeolite. The island is a gigantic horse of country rock imbedded in blue ground, and will doubtless disappear in depth as it is much smaller in the lower than in the upper levels.

FLOATING SHALE.

This appears to have been volcanic mud and contains no diamonds. It appeared at or near the surface and covered many claims. It has gradually become smaller in depth and has almost disappeared in the lower levels.

BLUE GROUND.

It is not easy to determine the nature of the blue ground, owing to the difficulty in obtaining slides for microscopical observations.

After a good many trials Dr. Stelzner succeeded in getting a few sections of blue ground which revealed the most surprising fact, to wit:—"The main body of blue ground is entirely analogous to the snake rock, naturally more decomposed, but in essential points the microscopic pictures of blue ground and snake (not taking into consideration the numerous little slate fragments in the blue) are in an extraordinary degree alike. It therefore impresses upon one's mind that the 'snake' is a younger eruptive formation coming from the same volcanic source as the blue ground."

The conclusion at which Dr. Stelzner and others have arrived after careful microscopical observations is, that the blue is of volcanic origin and came from the same source as the snake, *i.e.*, from below. There are different opinions as to when the diamond itself was formed or crystallized. The proofs are most conclusive that the diamonds were not formed *in situ* but have come up from below with the blue ground. The frequent occurrence of *broken* crystals imbedded in the blue is sufficient evidence that the diamonds are not in their original place of crystallization, for it is impossible for nature to produce a *broken* diamond.

In the vicinity of Kimberley there are four diamond bearing mines, Kimberley, De Beers,

Du Toit's Pan and Bultfontein, having the relative position to one another as shown on Plate 1. There are numerous other pipes carrying blue ground but these do not carry diamonds in payable quantities. The whole of the De Beers and Kimberley Mines belongs to the De Beers Consolidated Mines, Limited, and nearly the whole of the Du Toit's Pan and Bultfontein Mines are either perpetually leased or held under working agreements by this Company. Plates 24 and 25 show the holdings of the De Beers Company in these mines. The four mines were discovered some twenty years ago, all within a period of six months. From their discovery until within a short time, all the mines were worked as open quarries.

About six years ago a commencement was made in the Kimberley mine to work underground. Two years later an inclined shaft was started at De Beers. The system adopted in the latter mine was as follows:—Tunnels were driven across the mine from west to east about 120 feet apart. These tunnels were connected with each other by two tunnels running north and south, one near the west side of the mine and one midway between it and the east margin of the mine. From the east and west tunnels, short offsets ten feet long were driven every 36 feet. At the ends of the offsets galleries were driven 18 x 18 feet in cross section. The levels were 30 feet apart. When the galleries were driven 18 feet high, there remained a roof of blue ground 12 feet thick and a pillar 18 feet thick on both sides. It was found in practice that the galleries which were driven full size from the offsets were difficult to maintain and became unsafe for the workmen.

In order to avoid this a change was made in the system of working. The offsets are now driven to the surrounding rock, or when between two parallel tunnels, until they meet.

When near the rock they are widened out into galleries, these in turn being stoped on the sides until they meet, and upwards until they break through the blue ground. The reef* partially fills the open space. The workmen then stand on the fallen reef, and drill the blue ground overhead. As the roof is blasted back, the Reef follows.

This plan of working may perhaps present itself more clearly by reference to Plate 5.

When stoping between two tunnels, the blue is stoped up to the *debris* about midway between the two tunnels. The upper levels are worked back in advance of the lower levels and the works assume the shape of irregular terraces.

The main levels (or levels from which the blue ground is hoisted) are from 90 to 120 feet apart with intermediate levels every 30 feet. Hoisting is done from only one level at a time through the same shaft. All the ground lying between two main levels is dumped into shoots, and passes down to the main level where it is loaded into trucks and sent to the shaft, tipped into the skips and hoisted to the surface.

The tipping arrangement at the bottom is very simple, and consists of an iron shoot without a door. While the loaded skip is being hoisted four end tipping trucks are placed in position, and the door-catches loosened. The four doors are held closed by two natives. Directly the skip is seen to pass the shoot the trucks are tipped, and the tipping is done with such rapidity that it frequently occurs that the engine driver receives the signal to hoist before his engine has fairly stopped.

A description of No. 2 Incline Shaft at De Beers and the amount of blue hoisted through same will not only interest, but surprise most mining men.

The shaft has four compartments, one for a ladder way, one for the man trolley, and two for the skips. The skip ways are each five feet wide and four and a half feet high. The shaft is inclined 56 deg. 20 min. from the horizontal. The skips run on steel rails (46½ lbs. per yard).

The back wheels of the skips are about double the width of the front wheels. When the skips come into the pit head frame, the back wheels take a broader gauge track made of angle iron to keep them in place, while the front wheels pass within the frame and downwards, and dump the ground automatically into the box.

The gauge of the tracks in the incline is 3 feet 11 inches. At a point about 80 feet from the bottom the roads join, and the skips are filled alternately from the same shoot. The ground is hoisted from the 700 feet level (or 840 feet on the incline).

Plate 7 gives a sectional view of the pit head frame at this shaft. Plate 8 gives the skip in detail, and Plate 9 gives the box door arrangement.

These skips hold 64 cubic feet or four loads weighing 1,600 lbs each.

The amount of ground hoisted through this shaft from April 1st, 1889, to March 31st, 1890, was 1,355,089 loads, equal to 1,084,071 tons of 2,000 lbs.

*NOTE.—The word "Reef" as used at the Diamond Fields means the rocks surrounding the pipes of Blue ground.

The engine is a Tangye direct acting with slide valves and with two cylinders 18 in. by 36 in. with drum six feet in diameter, and was invoiced as a 70 nominal horse power. It has a steam reversing gear. The pressure of steam in the boilers is 80 lbs., but shows only 60 pounds as it enters the cylinder, being wire drawn in the ports. The engine was not constructed for such rapid work, and consequently both the inlet and exhaust ports are too small.

During the month of July, 1889, 142,567 loads were hoisted through No. 2 Incline. The following table of the best week's work will give an idea of what may be accomplished even with comparatively small engines.

| Date. | Day Shift. | Night Shift. | TOTAL. |
|-------------------|------------|--------------|-------------|
| Monday, July 22nd | 3,324 | 2,623 | 5,947 loads |
| Tuesday, " 23rd | 2,799 | 3,362 | 6,161 |
| Wednesday, " 24th | 3,127 | 2,868 | 5,995 |
| Thursday, " 25th | 3,069 | 3,153 | 6,222 |
| Friday, " 26th | 2,725 | 2,736 | 5,461 |
| Saturday, " 27th | 2,303* | 1,892** | 4,195 |
| | 17,347 | 16,634 | 33,981 |

* 8 hours. ** 7 hours.

A shift is from 10 to $10\frac{1}{2}$ hours, except on Saturday when the day shift is 8 hours and the night shift 7 to $7\frac{1}{4}$ hours.

The best day's work was 6,222 loads of 16 cubic feet or 4,977 short tons. For an hour at a time, hoisting has been carried on at the rate of five skip loads every three minutes, equal to 400 loads an hour.

ROCK SHAFT.

This shaft is situate on the North side of the mine and is to be the future working shaft of the mine. Its dimensions will be found in the report to the Directors.

Plate 10 gives the general arrangement of machinery at this shaft, and Plate 11 shows the dumping arrangement of the skips more in detail.

In order to have a perfectly constant load to hoist through the shaft a tail rope of the same size as the winding rope will be attached to the bottom of each skip and passed round a sheave set in a frame at the bottom of the shaft.

The Assistant Inspector of Mines, Capt. Quenatrall, in his report for 1889 gives the following description of the Rock Shaft Machinery, which is compiled from data furnished by our engineers :

"The most important additions to the machinery set at work during the past year have been at the new vertical Rock Shaft at De Beers, which is about 540 feet from the north side of the mine, and from which, at a depth of 800 feet, a level has been driven to the mine, draining it at that depth. At this shaft new pumping and winding engines, boilers, head-gear, &c., of the most modern kind, have been erected, as will be seen from the following descriptions :—

PUMPING ENGINE.

"This is a compound jet condensing engine, made by Simpson & Co., of London. The high-pressure cylinder is $14\frac{3}{4}$ inches diameter, and the low pressure cylinder 21 inches, with a stroke of 30 inches.

"Both high and low pressure cylinders are fitted with expansion valves, which work on the back of the ordinary side valve, and there is an auxiliary valve to supply high pressure steam to the low pressure cylinder when required.

"This engine is capable of developing about 120 horse power.

"The pinion is 1 foot 10 inches, and the spur-wheel 10 feet 6 inches ; giving a ratio of about 1 to 5.75.

"The fly-wheel is about 5 tons.

"The spur-wheel is fitted with bosses on the arms, provided for three lengths of pump stroke, viz., 6, 7, and 8 feet. At present the 6 feet stroke is used, conveyed by the sweep-rod direct to the shaft-bob.

“It will be very interesting to ascertain the actual duty performed by this engine, and I hope this will shortly be done.

WINDING ENGINE.

“This is a direct acting compound horizontal engine, supplied by the Grange Iron Company, Limited, of Durham, England.

“The cylinders are 24 inches diameter, with a stroke of 5 feet.

“There are two winding drums 10 feet 6 inches diameter by 4 feet 4½ inches in width, fitted with grooved trod, to prevent friction on the rope. This arrangement is acting admirably.

“There are powerful steam brakes attached, and also brakes that can be applied by means of foot-levers.

“Lawrence & Daglish’s patent automatic expansion gear is in use, and clutch-gear, for regulating the length of the rope, is connected to one of the drums. One of Tangye’s compound high pressure engines, with 16 inches cylinders and 28 inches stroke, geared 2 to 1, and 6 feet drum, will be used for the purpose of lowering and raising men, sending down materials, &c.

BOILERS.

“Four new ‘Fairbairn Beeley’ boilers have been erected to supply steam to the pumping and winding engines in this part of the mine, and, as this type of boiler contains many points of interest, and has only recently been introduced, I append longitudinal and transverse sections, which have been kindly supplied by the General Manager of De Beers, and which will give a good idea of its construction.

“The boiler consists of two vessels, C and D, the lower of which contains, for about two-thirds of its length, a single tube, in which the fire grate is arranged, the remaining one-third being multitubular, thus increasing the heating surface. To facilitate the removal of this tube, when repairs are necessary, the front plate is bolted to the boiler, and small wheels are attached to the lower part of the tube, which run on rails fixed within the boiler.

“One of the main features of this form of boiler is the great extent of heating surface exposed. It will be seen, by referring to the sections, that the flues reach to about the middle of the upper vessel, thus entirely enclosing the lower vessel, and nearly one-half the upper.

“The direction of the hot gases is indicated by the arrows.

“The ordinary mountings are attached, and to obtain drier steam a dome, W, is provided.

“The feed-pump employed is of the Cameron type, and a portion of the exhaust steam from the winding engine is passed through a water-heater to heat the feed water.

“The working pressure is 120 lbs.

“I believe experiments will shortly be made to determine the evaporative powers of these boilers, which will be very instructive.

“Substantial brick houses have been built for the boilers and winding engines, in which, as far as possible, the use of timber has been avoided. The roofs, doors, floors, window frames, &c., are all of iron, and every precaution has been taken to reduce the risk of fire to a minimum.

HEAD-GEAR.

“A new wrought iron trellis work head-gear is erected on this shaft. The height from the ground level to the centre of the pulleys is 61 feet. The corners of the legs and stays are 3½ inch angle iron, ½ inch thick. The lattice bars are 3½ inches by ½ inch.

“There are three 14-feet pulleys, cast iron rim and boss, with wrought iron spokes. Two of these 14-feet pulleys were cast whole by Fraser & Co., of Du Toit’s Pan, and the other was sent out in halves from England.

“Very convenient steps and hand-rail, leading to the pulley platform, are fixed on the right-hand back stay. The dumping level is 25 feet from the ground.

NEW ROCK SHAFT, PITWORK, ETC.

"The new vertical rock shaft is 20 feet by 6 feet, divided as follows:—Pump and ladderway compartment, 5 feet 6 inches by 6 feet with one cage and two skip compartments, each 4 feet 4 inches by 6 feet within timber.

"There is a very good ladderway fixed in this shaft, securely fenced off from the winding compartments.

"The pitwork, supplied by Harvey & Co., of Hayle, Cornwall, is of the ordinary Cornish type, and consists of three 9 inch plunger lifts, with 10 inch wood rods, and balance box at surface. The whole is working admirably. The quantity of water now being pumped is about 5,000 gallons per hour.

"New 3½ inch guide wires (Elliot's patent lock coil wire ropes) are about to be fixed in this shaft. Omerod's patent self-detaching hooks will be used, to prevent accident in case of overwinding; and a self-acting dumping arrangement will be adopted for tipping the skips. This shaft will shortly be the principal winding shaft of the mine, and when the plant is complete it is calculated that its hoisting capacity will be equal to 7,000 loads of 16 cubic feet in 24 hours. The sinking of this shaft below the 800 feet level will be shortly resumed, and a substantial ground pent house will be left, for the protection of the men employed in sinking."

Plate 13 represents the valve gear on the winding engine.

The gear is driven by eccentrics worked from short tail shafts attached to the main engine cranks.

The valves, of which there are two inlet and two outlet to each cylinder, are of the double beat equilibrium type, are lifted by rocking levers actuated directly from a straight-bar link motion, and fall to their seats by gravity, the inlet valves only being provided with dash pots. The inlet valves are seven inches and the outlet valves eight inches in diameter with a maximum lift of one and one-half inches. Each inlet valve has a bell crank attached to its stem, the horizontal arm of which contains a roller faced with rubber. A wedge actuated from the governor raises the roller more or less thus causing the vertical arm of the bell crank to become disengaged from its lifting lever at a period of the stroke corresponding to the rise of the governor, thereby regulating the speed of the engines automatically by the cut-off.

An attachment has also been provided whereby the same lever which opens the throttle valve operates the cut-off mechanism.

METHOD OF DEPOSITING.

From the surface boxes, into which the blue ground is tipped at the shafts, it is filled into twenty cubic feet side tipping trucks (see Plate 16) and sent to the floors by means of an endless wire rope haulage (see Plates 15 and 16). The rope is seven-eights of an inch in diameter, with an iron core to prevent the rope from becoming smaller in diameter as it is used. The length of the main haulage is three miles, with two branches, one mile, and three-quarters of a mile in length respectively. The engine which drives the ropes is a horizontal high-pressure engine with two cylinders each 14 inches in diameter and 3 feet stroke.

The engine is geared to the rope drums or pulleys, of which there are three, by means of spur and pinion wheels geared six to one. The pulleys are 9 feet in diameter and 10 inches wide and made concave and are lined with cast steel segments which can be replaced at slight cost should they wear out.

The couplings on the drums are supplied with tension bands and spiral springs. These were added with the view of allowing the drums to slip in case of anything going wrong on the tram lines. It was found in practice, however, that it was impossible to set these tension bands to such a nicety that they would act when trucks were capsized along the line. The load is variable. At times trucks are being put on at the rate of only two hundred an hour, at times this number is doubled. It is obvious, therefore, that the tension is impracticable.

The De Beers haulage differs from those in other parts of the world in the following manner:—As a rule a haulage plant is erected to convey material from one point (a mine for instance) to a fixed terminus. In the case of depositing blue ground at De Beers the floors commence about a mile from the mine and extend for three miles in an easterly direction and a mile in a westerly direction.

By reference to the plan of the De Beers floors (Plate 14), the line of the depositing haulages can be seen. Section No. 1 commences at the mine and ends at A, the engine house,

distance about one mile. Section No. 2 extends from the engine house to C, a distance of two miles.

At point marked B, a branch line extends to D and E nearly a mile long. This line when in use is driven by passing the main haulage rope around a sheave at B. The rope B D E passes around another sheave at B which is clamped to the sheave on the main rope. When not in use these sheaves are disconnected. Section No. 3 extends from the engine house to the west side of floor No. 3.

The rope is carried upon jockeys fixed to the top of the trucks. The jockey turns in a socket and is riveted to it. The upright part is in line with the rope. When the rope is dropped into the V of the jockey it is thrown about three inches out of line, which causes the jockey to turn and grip the rope. The grip is firm enough to take trucks up an incline of one in twenty. When blue ground is being deposited on floors nearer than the terminus, the rope beyond the *take-off* is suspended on carrying sheaves. These sheaves are about twelve inches in diameter and run loose on shafts, which rest on A shaped frames made of deal, and set firmly in the ground on either side of the tram roads. The frames are placed one hundred yards apart. Trucks can be hauled around curves by having U shaped sheaves for the rope and jockey to pass around. It is also necessary to have two guide rails inside the wheels, raised so that the axles just pass over them.

When the trucks leave the main haulage lines they are drawn by horses to the depositing floors and tipped.

Besides the mine haulage lines, there are two in use taking blue up the inclines at the washing machines, each about half-a-mile long. One is driven by spur gear from the main shaft of the machines, the other is driven by spur gear on a counter shaft which is driven by mitre gear from the main shaft. This gear is so arranged that the haulage can be run in either direction. The speed of the haulages varies from two-and-a-half to four miles per hour. The trucks are counted automatically as they are sent to the floors by a reciprocating engine counter placed upon a frame near the tram line.

They are also greased automatically by iron wheels placed in a box between the rails. The clasps which hold the axles to the pedestal are so placed as to allow the greasing wheels to touch the axle where it comes in contact with the pedestal.

THE FLOORS (SEE PLATES 14 AND 23.)

These are made by removing the bush and grass from a fairly level piece of ground. The land is then rolled and made as hard and smooth as possible. The De Beers floors on Kenilworth (a farm of some 17,000 acres belonging to the Company) are laid off in rectangular sections 600 yards long and 200 yards wide. Each section holds about 50,000 loads. The depositing is done on portable tram lines extending from the main lines on either side of the floors.

UNIT OF MEASUREMENT.

A truck holding 16 cubic feet was generally used about the surface when the mines were worked in the open and is now used in the underground workings. This has become the unit of measurement throughout the Fields.

A load of blue ground weighs about 1,600 lbs. and covers about 21 square feet when deposited on the floors.

For a time the blue ground remains on the floors without much manipulation. The heat of the sun and moisture soon have a wonderful effect upon it. Large pieces which were as hard as ordinary sand stone when taken from the mine soon commence to crumble. At this stage of the work the winning of the diamonds assumes more the nature of farming than mining. The ground is continually harrowed to assist pulverization by exposing the larger pieces to the action of the sun. Spans of mules are at present used for drawing the harrow to and fro, but steam traction engines with gear for drawing the harrows have been ordered. These will be more economical than the present manner of working.

The length of time necessary for the ground to be exposed before it becomes sufficiently pulverized for washing depends on the season of the year and the amount of rain.

The blue ground of the four mines differs as to length of time necessary for pulverization. The blue from Kimberley Mine becomes quite well pulverized in three months during the summer, while that from De Beers requires double that time. The longer the ground remains exposed the better it is for washing.

WASHING MACHINES.

These consist of pans (see plate 18) and other machinery as shown in sectional elevation on plate 17.

The usual size of the pans is 14 feet in diameter with ten arms, each having six or seven teeth. The teeth are set to form a perfect spiral, so that when the arms revolve the teeth carry the heavy deposit to the outer rim of the pan, while the lighter material passes towards the centre and is discharged from the pan. The blue ground is hoisted to the top of the machines either in bucket elevators (Du Toit's Pan) by mechanical haulages or inclined planes (De Beers and Kimberley) or by direct hoists, the trucks being run on cages and hoisted and tipped automatically as the cage ascends (lately adopted at De Beers and Kimberley).

The latter arrangement has the advantage of cheapness of construction and simplicity. The blue ground when hoisted to the proper level is dumped in a long shoot (see plate 17) which has perforated pipes laid across it. The movement of the ground downwards into the revolving cylinder is regulated by the flow of water through the perforated pipes. The cylinders are 2 feet 6 inches in diameter, covered with heavy iron or steel netting with meshes one inch square or with perforated iron plates with round holes one and one quarter inches in diameter. As the blue ground enters the cylinders both clear and muddy water are added.

It has been found in working, that diamonds separate from the mass of lighter material much better in a properly thick puddle. The muddy water is separated from the tailings by means of a revolving screen (De Beers) and conveyed to the top of the machines by means of a bucket elevator.

The ground which is too coarse to pass through the meshes or holes of the cylinder passes out of the lower end of same into trucks and is re-deposited upon the floors where it remains for about twelve months when it is again washed.

The fine ground which passes through the meshes of the cylinder flows into the pans at the outer rim and is discharged near the centre. The heavy deposit which contains the diamonds remains on the bottom of the pan and near the outer rim. This deposit is drawn off every twelve hours by means of a broad slot in the bottom of the pan. A truck is placed underneath the pan, the slide drawn and the deposit run off. The deposit is forced out of the pan by means of scrapers which are attached to the arms. It is the custom to set several pans together in a nest. At De Beers every two pans are discharged into a third (safety pan) which is similar in construction to the others. From the safety pans the tailings pass into tanks and are hoisted in tubs by means of aerial gears (De Beers) (see Plate 19), or by means of bucket elevators and are deposited in heaps.

The average quantity of blue ground passed through a pan is from 400 to 450 loads in ten hours. The deposit remaining in each pan, after putting the above number of loads through it, amounts to three or four loads. These are sent to the Pulsator for further concentration.

SAFETY PANS.

In a test of 100,000 loads of De Beers blue, the yield of the safety pans was one carat for every 100 loads washed.

PULSATORE.

Plate 20 gives a representation of this machine. There are three of these machines in one building on the De Beers floors, where all the deposit from both De Beers and Kimberley washing machines is manipulated. The operation at the Pulsator is as follows:—

The trucks containing the deposit from the pans are hoisted in a cage to a platform where the deposit is fed by means of a shoot, E, into the cylinder C D. This cylinder is covered with iron plates perforated with four sizes of *round* holes $\frac{1}{8}$ inch, $\frac{3}{16}$ inch, $\frac{1}{4}$ inch, $\frac{3}{8}$ inch in diameter.

That portion of the deposit which is too coarse to pass through the screens passes out at the end of the cylinder, where it is sorted.

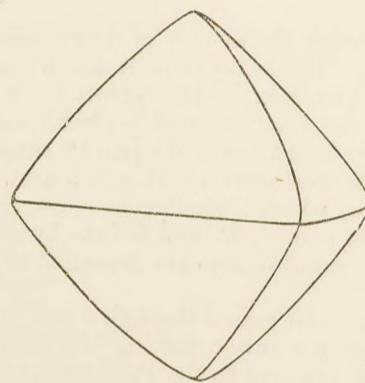
The four sizes which pass through the screens flow upon jigs; these are made stationary the bottoms being covered with screens, the meshes of which are $\frac{1}{8}$ inch, $\frac{3}{16}$ inch, $\frac{1}{4}$ inch, $\frac{3}{8}$ inch *square*, which are a little coarser than the plates on the cylinder. Upon the screen a layer of leaden bullets is spread. These bullets prevent the deposit from passing through the screens too rapidly. The heavy deposit with the diamonds passes through the screens into the pointed boxes F, whence it is drawn off through pipe G and taken to the sorting tables. The lighter material or refuse passes over the lip H into trough I, and thence into trucks by means of which it is hauled away and dumped

upon the tailing heap. The following is the proportion of concentration. Out of 7,200 loads washed 72 loads were sent to the Pulsator. Of the 72 loads 6 pass through the screens, 24 loads pass out of the end of the cylinder, and the remaining 42 loads flow over the jigs as waste. Out of every 240 loads of blue washed one load or 16 cubic feet of gravel passes through the hands of the assorters. The assorting is done on tables, first, while wet by white men, and then, when dry, by native convicts. The deposit is gone over as often as diamonds can be found in sufficient quantity to repay the cost of convict labour.

The minerals which reach the sorting tables with the diamonds are 1, Pyrope (Garnet), having a specific gravity of 3.7 and containing from 1.4 to 3 per cent. of oxide of chrome ; 2, Zircons (G. 4 to 4.7), flesh-coloured grains and fragments, but no crystals ; 3, Disthene (G. 3.45 to 3.7), discernable by its blue colour and perfect cleavage ; 4, Chrome Diopside (G. 3.23 to 3.5), in fragments, colour bright green ; 5, Enstatite (G. 3.1 to 3.3) ; 6, Mica ; 7, Magnetite ; 8, Non-magnetic Iron Ore, containing chrome and titan in changeable quantities, that is to say, it is sometimes chrome iron and sometimes titan iron ore. According to analyses by Knop it contains from 13 to 61 per cent. of oxyde of chrome and from 3 to 68 per cent. of titanic acid ; 9, Hornblende ; 10, Barytes.

THE DIAMOND.

The diamond occurs in all shades of colour from deep yellow to blue white, from deep brown to light brown and in a great variety of colours, green, blue, pink, brown, yellow, orange, pure white, and opaque. It is the hardest of known substances and has a specific gravity of 3.53. The stones vary in size from that of a pin's head to the size of the cut given below. This diamond weighed 428½ carats in the rough, (a carat weighs 3.17 Troy grains), and is the largest stone ever found in the four mines. It measured 1½ inches through the longest axis and 1½ inches square. The following cut represents the size and shape of the stone as found.



It was found in the De Beers mine by a native, whose "brother" gave information which led to its recovery while being taken from the mine. It was cut and exhibited at the Paris Exposition 1889. Its weight after cutting was 228½ carats, having lost 200 carats in the process of cutting.

After assorting at the Pulsator the diamonds are sent daily to the general office under an armed escort, and delivered to the valuators in charge of the diamond department. The first operation is to clean the diamonds of any extraneous matter by boiling them in a mixture of nitric and sulphuric acids. When cleaned they are carefully assorted with reference to size, colour and purity. Parcels are then made up, and when valued are sold to local buyers, who represent the leading diamond merchants of Europe.

The size of a parcel varies from a few thousand, to tens of thousands of carats. In one instance two years ago nearly a quarter of million of carats were sold in one lot to one buyer.

In order to prevent illicit traffic, the quantities of diamonds found are reported to the Detective Department, both by the producers and by the exporters. All diamonds except those which pass through illicit channels are sent to England by registered post. The weekly shipments average from 40,000 to 50,000 carats. The greatest outlet for stolen diamonds is through the Transvaal to Natal where they are shipped by respectable merchants, who turn a deaf ear to any information from the Diamond Fields to the effect that they are aiding the sale of stolen property. The value of the diamonds stolen was at one time half a million to one million sterling per annum.

This amount has been greatly lessened by means of the compounding of the natives. Illicit diamond buying (I.D.B.) is still carried on to a considerable extent, judging from the number of convictions for contravening the Diamond Trade Act.

NUMBER OF EMPLOYES.

| | | | | | | | White | Natives |
|---------------|-----|-----|-----|-----|-----|-----|-------|---------|
| De Beers | ... | ... | ... | ... | ... | ... | 682 | 2,780 |
| Kimberley | ... | ... | ... | ... | ... | ... | 495 | 1,800 |
| Du Toit's Pan | ... | ... | ... | ... | ... | ... | 67 | 400 |
| Bultfontein | ... | ... | ... | ... | ... | ... | 37 | 300 |

WAGES.

The following figures give about the average wages paid for various kinds of labour at the mines : Mechanics, £6 to £7 per week ; Miners from £5 to £6 per week ; Guards and Tallymen from £4 to £5 per week ; Engine drivers £6 per week ; Natives in the underground works from 4s. to 5s. a day.

ON THE FLOORS.

Overseers from £3 12s. 0d. to £4. 2s. 0d. Machine men and assorters from £5 to £6. Engine drivers £6. Natives (ordinary labourers) 17s. 6d. to 21s. per week.

Drivers from 25s. to 27s. 6d. per week. Every employé has a percentage on the value of diamonds found by himself. On the floors the white employés receive one shilling and sixpence and the natives three pence per carat.

Nearly double these amounts are paid for stones found in the mines.

ACREAGE OF THE MINES.

The acreage of the open works of the four mines is as follows :—

| De Beers | Kimberley | Du Toit's Pan | Bultfontein |
|----------|-----------|---------------|-------------|
| 18.68 | 31.00 | 35.05 | 27.00 |

At the level of the hard rock the area of De Beers Mine is 10.12 acres of which 5.97 are worked and at Kimberley Mine 4.55 acres of which 2.69 are worked.

TEMPERATURE OF THE UNDERGROUND WORKS.

No. 2, Incline De Beers (upcast shaft).

| | | | | | | | | |
|----------------------|-----|-----|-----|-----|-----|-----|-----|------------|
| 20 feet from surface | ... | ... | ... | ... | ... | ... | 70° | Fah. |
| 70 " | " | ... | ... | ... | ... | ... | 72° | |
| 380 " | " | ... | ... | ... | ... | ... | 75° | at station |
| 500 " | " | ... | ... | ... | ... | ... | 77° | " |
| 600 " | " | ... | ... | ... | ... | ... | 78° | " |
| 700 " | " | ... | ... | ... | ... | ... | 73° | " |

ROCK SHAFT (DOWNCAST).

| | | | | | | | | |
|----------------------------------|-----|-----|-----|-----|-----|-----|-----|--|
| At surface, in shade | ... | ... | ... | ... | ... | ... | 55° | |
| 800 feet from surface at station | ... | ... | ... | ... | ... | ... | 54° | |

On the 595, 625 and 655 feet levels the temperature in the hottest places is from 82° to 93°. This temperature is abnormally high and will be greatly reduced when the connections are made between the 700' and 800' levels on the south side of the mine.

At Kimberley the following temperatures were noted :—

| | | | | | | | | |
|-------------------------------------|-----|-----|-----|-----|-----|-----|-----|------|
| At surface 11 a.m. in shade | ... | ... | ... | ... | ... | ... | 56° | Fah. |
| Bottom Kendrick shaft (Downcast) | ... | ... | ... | ... | ... | ... | 70° | |
| Bottom Harvey shaft (725' level) | ... | ... | ... | ... | ... | ... | 70° | |
| West End tunnel (725' level) | ... | ... | ... | ... | ... | ... | 92° | |
| Tunnel centre of Mine | ... | ... | ... | ... | ... | ... | 82° | |
| East end tunnel | ... | ... | ... | ... | ... | ... | 88° | |
| Bottom standard shaft (upcast) | ... | ... | ... | ... | ... | ... | 90° | |
| 200' from surface in standard shaft | ... | ... | ... | ... | ... | ... | 91° | |

The above temperatures were taken while some of the tunnels were caved and while the levels below the 725' were full of water, consequently the circulation of air was greatly impeded.

The water is pumped out of the mine by means of a geared steam pump, steam being taken down the Standard shaft. This increases the temperature in the underground works.

VENTILATION.

Ventilation in both mines is by natural draft. At De Beers 43,166 cubic feet of air per minute pass into the mine. At Kimberley 14,560 cubic feet.

RAINFALL AT KIMBERLEY—For Seven Years from July, 1883 to June, 1890, is as follows:—

| YEAR. | | Number of days rain fell. | Inches. |
|-----------|-----|---------------------------|---------|
| 1883—1884 | ... | 79 | 22.61 |
| 1884—1885 | ... | 41 | 9.31 |
| 1885—1886 | ... | 64 | 14.22 |
| 1886—1887 | ... | 68 | 21.38 |
| 1887—1888 | ... | 92 | 24.513 |
| 1888—1889 | ... | 71 | 12.942 |
| 1889—1890 | ... | 81 | 24.554 |
| Average | ... | 70.88 | 18.432 |

YIELD OF BLUE GROUND.

The average yield of diamonds per load of blue is about as follows:—

Kimberley from $1\frac{1}{4}$ to $1\frac{1}{2}$ carats

De Beers from $1\frac{1}{5}$ to $1\frac{1}{3}$ carats

Du Toit's Pan from $\frac{1}{6}$ to $\frac{1}{5}$ of a carat

Bultfontein from $\frac{1}{5}$ to $\frac{1}{3}$ of a carat.

RETURNS.

The following returns show the imports of diamonds into and exports from Kimberley with summary of production of Diamonds in the four mines of Griqualand West *viz*: Kimberley, De Beers, Du Toit's Pan, and Bultfontein, as published by the Board for the Protection of Mining Interests.—Imports of Diamonds into Kimberley from January 1st to December 31st 1889:—

| From Colony, England, &c. Weight. | From Free State. Weight. | From River Diggings. Weight. | Total Weight carats. | Value. |
|--------------------------------------|-----------------------------|---------------------------------|-------------------------|------------------|
| 7,416 $\frac{1}{4}$ | £1,346 2s. 3d. | 111,735 | 29,492 $\frac{1}{2}$ | £78,484 19s. 9d. |

SUMMARY OF PRODUCTION for the Year 1889.

| MINE. | Carats. | Valuation. | Average per Carat. | | | | |
|-----------------------------------|-------------------------|------------------------------|--------------------|----|------------------|----|------------------|
| | | | £ | s. | d. | s. | d. |
| De Beers | 947,195 | 1,312,871 19 0 $\frac{1}{4}$ | 1,312,871 | 19 | 0 $\frac{1}{4}$ | 27 | 6 |
| Kimberley Mine | 816,135 | 1,132,490 7 11 $\frac{3}{4}$ | 1,132,490 | 7 | 11 $\frac{3}{4}$ | 27 | 9 $\frac{1}{4}$ |
| Du Toit's Pan | 450,336 $\frac{1}{4}$ | 897,586 2 0 | 897,586 | 2 | 0 | 39 | 10 $\frac{1}{4}$ |
| Bultfontein | 541,300 $\frac{3}{4}$ | 746,817 4 0 | 746,817 | 4 | 0 | 27 | 7 |
| St. Augustine and Others | 237 $\frac{3}{4}$ | 381 7 6 | 381 | 7 | 6 | 32 | 1 $\frac{1}{2}$ |
| Totals | 2,755,204 $\frac{3}{4}$ | 4,090,147 0 6 | 4,090,147 | 0 | 6 | 29 | 8 $\frac{3}{8}$ |

EXPORTS from January 1st to December 31st, 1889.

| DATE. | No. of Carats. | Declared Value. | Average per Carat. | |
|-----------------------|-------------------------|-----------------|--------------------|------------------|
| | | | £ | s. d. |
| January | 304,659 $\frac{3}{4}$ | 352,165 9 11 | 23 | 1 $\frac{3}{8}$ |
| February | 323,962 $\frac{3}{4}$ | 389,761 14 3 | 24 | 0 $\frac{5}{8}$ |
| March | 299,859 $\frac{1}{4}$ | 314,596 2 0 | 20 | 11 $\frac{3}{4}$ |
| April | 281,681 $\frac{1}{2}$ | 377,859 16 6 | 26 | 9 $\frac{7}{8}$ |
| May | 274,570 $\frac{1}{4}$ | 366,022 4 7 | 26 | 7 $\frac{7}{8}$ |
| June | 252,494 $\frac{1}{2}$ | 344,546 19 11 | 27 | 3 $\frac{3}{8}$ |
| July | 200,727 $\frac{1}{4}$ | 317,636 3 0 | 31 | 7 $\frac{3}{4}$ |
| August | 240,638 $\frac{3}{4}$ | 387,886 7 5 | 32 | 2 $\frac{3}{4}$ |
| September | 174,200 $\frac{1}{2}$ | 286,148 10 11 | 32 | 10 $\frac{1}{8}$ |
| October | 210,470 | 384,391 9 7 | 36 | 6 $\frac{5}{6}$ |
| November | 178,743 | 333,932 4 6 | 37 | 4 $\frac{1}{4}$ |
| December | 219,887 | 469,673 15 3 | 42 | 8 $\frac{5}{8}$ |
| Totals | 2,961,894 $\frac{1}{2}$ | 4,824,620 17 10 | 29 | 2 $\frac{3}{8}$ |

SUMMARY OF PRODUCTION OF DIAMONDS at the Griqualand West Mines, Kimberley, De Beers, Du Toit's Pan, Bultfontein, and St. Augustine, &c., from September 1st, 1882, to December 31st, 1889.

| DATE. | Carats. | Valuation. | Average per Carat. | |
|-------------------------|-------------------------|------------|--------------------|-----------------|
| | | | £ | s. d. |
| 4 Months, 1882 | 856,353 $\frac{3}{8}$ | 1,119,210 | 26 | 9 |
| 12 " 1883 | 2,312,234 $\frac{1}{4}$ | 2,359,466 | 20 | 4 $\frac{3}{4}$ |
| 12 " 1884 | 2,204,786 $\frac{1}{2}$ | 2,562,623 | 23 | 2 $\frac{3}{4}$ |
| 12 " 1885 | 2,287,261 | 2,228,678 | 19 | 5 $\frac{3}{4}$ |
| 12 " 1886 | 3,047,639 $\frac{3}{4}$ | 3,261,574 | 21 | 5 |
| 12 " 1887 | 3,646,899 $\frac{3}{4}$ | 4,033,582 | 22 | 1 $\frac{1}{2}$ |
| 12 " 1888 | 3,565,780 $\frac{3}{4}$ | 3,608,217 | 20 | 2 $\frac{1}{2}$ |
| 12 " 1889 | 2,755,204 $\frac{3}{4}$ | 4,090,147 | 29 | 8 $\frac{3}{8}$ |
| Totals | 20,676,160 | 23,263,497 | 22 | 5 $\frac{7}{8}$ |

WATER SUPPLY.

The water used by the Company is derived from three sources *viz*: from the mines, from surface wells, and from the Vaal River. The Vaal river water is supplied by the Kimberley Waterworks Company at 1s. per 100 gallons to the inhabitants and 8d. to the mining Companies. The water is pumped 16 miles and to a height of 500 feet above the river.

COMPOUNDS.

Reference has been made to compounds for native labourers. The large mine compounds at De Beers and Kimberley cover several acres. They are constructed as follows:—

On the four sides of a square are rows of one story buildings constructed of corrugated iron, these are divided into rooms holding about twenty natives each. A high iron fence is erected around the compounds, ten feet from the building. Within the compounds is a store where all necessities of life are supplied to the natives. Wood and water are supplied free of charge. A large swimming bath is provided. At De Beers all sick natives are taken care of in a hospital connected with the Compound. Medical attendance, nurses, and food are supplied free by the Company.

COST OF FUEL AND OTHER SUPPLIES.

Welsh steam coal costs £8 10s. 0d. to £8. 15s. per ton of 2,000 lbs of which amount over £6 is paid for rail carriage from Port Elizabeth.

Deals (3 x 9) cost from 8½d. to one shilling per running foot.

ELECTRIC PLANT.

The following description of Electric plant is furnished by the electrician Mr. Drummond :—

There are ten circuits of electric lamps for De Beers and Kimberley Mines, six running and four in course of erection. They consist of 52 arc lamps of 1,000 candle power each, and 691 glow lamps of 16 and 64 candle power each, or a total illuminating power of 63,696 candle power, the attached memo shows the different types of dynamos used, and the distribution of the lamps. Circuits No. 1 to 8 are driven at the De Beers Electric light station by two engines a 25 N. H. P. Fowler, compound and a 25 N. H. P. Marshall. Steam is supplied from the Fairbairn Beeley Boilers at the Rock Shaft. No. 9 and 10 circuits will be driven by a 10 N. H. P. Fowler compound condensing engine at Kimberley, and supplied with steam from a separate boiler—These circuits are worked at Kimberley, so as to have as little of them as possible exposed to the effects of the severe thunderstorms which are of frequent occurrence here in the summer time. These storms are likely to injure the insulation of the underground circuits, as the atmospheric discharge, preferably takes the easiest path to earth, and if the insulation was damaged the lights would be extinguished. Special fittings were designed for the underground works as the tunnels are very damp and it is impossible to keep up the insulation with the ordinary fittings. The De Beers Mine circuit has now been running for 15½ months, night and day, with the exception of a short stoppage on Sundays. There has never been a cessation to the light during working hours, with one exception, when the engine was stopped for ten minutes to remake a joint. The outside circuits are specially constructed to be guarded against thunderstorms, suitable lightning discharges have been erected since last September, and since that date the circuits have been run through all thunderstorms. On three occasions the circuits were struck several times but no damage was done, the arresters discharging to earth and the lights not being interfered with. The arc circuits run about 300 hours a month and the Mine about 700 hours.

There are thirty telephones connecting the different centres of work together. Most of these are of the "Blake Bell Type" with electro magneto bells, and are run in circuits of from three to eight on the one line. Electric Bells are used for signalling in shafts and on haulages, there are over eighty in use for these purposes. The erection of the bells is specially designed to work in damp places, the insulation keeps perfect, and they seldom give any trouble or go out of order.

| Distinguishing Number of Circuit. | Type of Dynamo used giving output in Volts and Amperes. | Section of Works Lighted. | Number of Lamps and type giving candle power and maker. |
|---|--|--|--|
| 1 | “Ellwell Parker” dynamo, 650 volts and 10 ampires at 1,100 revolutions a minute. Series wound. | West End Compound Fence, Open Mine, Pit Head Yard, Convict Station and Pulsator Compound, De Beers. | 10 Arc lamps of 1,000 candle power each, “Crompton’s” patent. |
| 2 | “Ellwell Parker” dynamo, 650 volts and 10 ampires at 1,100 revolutions a minute. Series wound. | Mechanical Haulage 1st Section and part of the 2nd or 3rd Sections, De Beers. | 10 Arc lamps of 1,000 candle power each, “Brockie Pell’s” patent. |
| 3 | “Brush” dynamo, 7 L type, 1,100 volts and 10 ampires at 950 revolutions a minute. Series wound. | Mechanical Haulage, No. 2 or 3 Section and part of No. 1 Section, Mechanical Haulage Engine House, Stables and Compound, De Beers. | 12 Arc lamps of 1,000 candle power each, “Crompton’s” patent. 8 Arc lamps of 1,000 candle power each, “Brush” patent. |
| 4 | “Brush” dynamo, 7 L type, 1,100 volts and 10 ampires at 950 revolutions a minute. Series wound. | West End Compound Hoisting Engine and Boiler Houses, Free Compound. Search House and Head Gears, De Beers. | 48 Glow lamps of 16 candle power each, “Edison and Swan” patent. 1 Arc lamp of 1,000 candle power, “Brush” patent. 50 Bernstein glow lamps of 16 and 64 candle power each, “Bernstein” patent. 30 Glow lamps of 16 candle power each in groups, “Edison and Swan” patent. 200 Glow lamps of 16 candle power each, “Edison and Swan” patent. |
| 5 | “Manchester” dynamo, 5A type, 120 ampires 110 volts at 700 revolutions a minute. Shunt wound. | Underground Works, De Beers. | 60 Glow lamps of 16 candle power each, “Edison and Swan” patent. In course of erection. |
| 6 | “Kimberley” dynamo, No. 1 type 40 am- pires 110 volts at 1,000 revolutions a minute. Shunt wound. | Electric Light Engine House, Pump Room, Beeley Boiler House, Rock Shaft Hoisting Engines and Head Gear, De Beers. | 103 Glow lamps of 16 candle power each, “Edison and Swan” patent. |
| 7 | “Manchester” dynamo, 5 type 33 ampires 240 volts at 950 revolutions a minute. Compound wound. | The Masonic Temple, Du Toit’s Pan Road. | 11 Arc lamps of 1,000 candle power each, “Brush.” In course of erection. |
| 8 | “Brush” dynamo, 7 L type 1,100 volts and 10 ampires at 950 revolutions a minute. Series wound. | Compounds, Floors and Haulage, Kimberley. | 100 Glow lamps of 16 candle power each, “Edison and Swan” patents. In course of erection. |
| 9 | “Manchester” dynamo, No. 4 type 60 am- pires and 110 volts at 950 revolutions a minute. Shunt wound. | Compounds, Hoisting Engine and Boiler Houses, Head Gears and shops, Kimberley. | 160 Glow lamps of 16 candle power each, “Edison and Swan” patent. In course of erection. |
| 10 | “Manchester” dynamo, No. 4 type 60 am- pires and 110 volts at 950 revolutions a minute. | Underground Works, Kimberley. | |

There is one spare Ellwell Parker dynamo in case of breakdowns and a spare armature to each of the other dynamos, there are also spare “Crompton” “Brush” and “Brockie Pell” arc lamps kept clean and tested, ready to replace any that go wrong on the circuits.

The following condensed report on the De Beers Mine pumping plant is furnished by Mr. L. J. Seymour, one of the Company's Engineers.

This plant consists of three nine inch by six foot stroke plunger pumps whose total lift is 820 feet, and a five-inch by six foot stroke section lift raising water twenty-four feet, all driven by a compound condensing engine with intermediate receiver, having cylinders $14\frac{3}{4}$ inches and 21 inches diameter respectively and 30 inch stroke, working on cranks at right angles whose shaft is geared in the ratio of 18 to 107 to the bob driving the spear-rod. The engine is provided with a double acting air-pump $5\frac{1}{2}$ inches diameter, and a single acting feedpump $3\frac{3}{4}$ inches diameter, both with 30 inch stroke. Both cylinders and receiver had their sides steam-jacketed at full pressure. The valves are plain slides having Meyer cut-off slides on their backs. The surface condenser is placed in the rising main about 40 feet from the low pressure cylinder. The boiler is of the Fairbairn-Beeley type, see plate 12, set in brick-work, has 23 square feet of grate surface and 1,328 square feet of heating surface or a ratio of 1 to 576.

During the test the coal and feed water were weighed, indicator cards taken every half-hour, and all conditions noted according to the standard prescribed by the Society of Mechanical Engineers.

The mine water which contained considerable sediment was weighed during twenty consecutive periods and a mean taken.

| | 1ST. TEST. | 2ND. TEST. |
|---|------------|------------|
| Duration of test (hours) ... | 24. | 24. |
| Pounds coal consumed (including wood equivalent) ... | 2176.5 | 2125. |
| " refuse remaining ... | 158.5 | 74. |
| Per centage of moisture ... | 1.37 | 1.14 |
| " of refuse ... | 6.2 | 3.5 |
| Pounds combustible in coal ... | 1988. | 2027. |
| Temperature of feed water (degrees Fah.) ... | 113.1 | 105.7 |
| Pressure of steam gauge (lbs.) ... | 89.53 | 88.43 |
| " of atmosphere (corrected for temperature) ... | 12.89 | 12.90 |
| Pounds water evaporated ... | 20023. | 20575. |
| " water evaporated, per lb. coal ... | 8.955 | 9.682 |
| " from and at 212° ... | 10.22 | 11.11 |
| " from and at 212° per. lb. combustible ... | 11.49 | 11.64 |
| " coal required to supply radiation ... | 738.8 | 738.8 |
| Total revolutions of engines ... | 50093. | 49135. |
| Rovolutions per minute ... | 34.77 | 34.12 |
| Receiver pressure (lbs.) ... | 6.09 | 7.01 |
| Vacuum (inches) | 23.98 | 24.05 |
| Barometer (corrected) | 26.23 | 26.27 |
| Indicated horse power ... | 33.69 | 32.12 |
| Pounds water condensed in jackets ... | 3405. | 3439. |
| Per centage of total feed so condensed ... | 17. | 16.7 |
| Pounds feed water per indicated horse power per hour | 24.71 | 26.69 |
| Pounds coal per indicated horse power per hour | 2.69 | 2.75 |
| Total strokes of each pump ... | 8426.8 | 8265.7 |
| Pounds water actually raised per stroke ... | 161. | 161.25 |
| Total height raised in feet ... | 828. | 828. |
| Indicated horse power required to raise the water ... | 23.9 | 23.2 |
| Difference between engine and pump horse power ... | 9.79 | 8.92 |
| Per cent. of indicated horse power lost by friction ... | 29. | 27.7 |
| Temperature of mine water before entering condenser ... | 67° | 67° |
| " after leaving ... | 79° | 79° |
| Thermal Unit in each lb. coal (1 lb. combustible = 14500 T.U.) ... | 13601. | 13992.5 |
| " " given to feed-water ... | 11099.1 | 11249.6 |
| " " out by engines ... | 953.4 | 932.6 |
| " " utilized by pumps ... | 676.7 | 673.2 |
| Carbon value of one lb. coal ... | .938 | .966 |
| Relative value of coals for evaporation ... | .92. | 100. |
| Efficiency of boiler ... | .816 | .804 |
| Combined efficiency of coal and boiler ... | .765 | .776 |
| Efficiency of the steam engine ... | .0859 | .0829 |
| " " pumps (full barrel water = 100) ... | .973 | .973 |
| " " plant = $\frac{\text{ft. lbs. contained in coal}}{\text{ft. lbs. used to raise water}}$... | .0498 | .048 |
| Duty. (ft. lbs. water per 100 lbs. coal ... | 52180000. | 51893000. |

GARDNER F. WILLIAMS,

General Manager.

Statement of Liabilities and Assets for the Year ending 31st March, 1890.

| TO CAPITAL ACCOUNT: | | BY CLAIM ACCOUNT ... | | £7,454,871 16 2 |
|---|--------------------|----------------------|--|-----------------|
| Nominal | ... £3,950,000 0 0 | | | |
| Unissued | - 1,045 0 0 | £3,948,955 0 0 | | |
| " DEBENTURES : | | | | |
| De Beers Consolidated Mines, Limited, 1st Debentures | £2,250,000 0 0 | | | |
| De Beers Consolidated Mines, Ltd., 2nd Debentures £1,750,000 | | | | |
| Less unissued, £394,500 ... | 1,355,500 0 0 | | | |
| Griqualand West Diamond Mining Co. Debentures ... | 158,000 0 0 | | | |
| De Beers Bultfontein Obligations ... | 745,400 0 0 | | | |
| " TEMPORARY ADVANCES ... | 4,508,900 0 0 | | | |
| " BULTFONTEIN MINE SUSPENSE ACCOUNT ... | 482,076 4 1 | | | |
| " INSURANCE FUND ... | 98,619 13 4 | | | |
| " BILLS PAYABLE (since paid) | 18,750 0 0 | | | |
| " SUNDY CREDITORS ... | 90,000 0 0 | | | |
| " SUNDY CREDITORS ... | 43,650 2 10 | | | |
| " INTEREST ACCOUNT : | | | | |
| Interest due to the 31st March on De Beers 1st and 2nd Debentures ... | ... 39,263 2 6 | | | |
| Interest due to 31st March on Griqualand West Debentures ... | 2,765 0 0 | | | |
| Interest due to 31st March to Consolidated Co. Bultfontein ... | 13,034 11 0 | | | |
| Interest due to 31st March to Griqualand West Co. | 8,496 2 0 | | | |
| " LONDON OFFICE ... | 63,558 15 6 | | | |
| " UNCLAIMED DIVIDEND WARRANTS, &c. ... | 15,138 6 0 | | | |
| " PROFIT AND LOSS ACCOUNT BALANCE ... | 527 6 4 | | | |
| | 465,416 1 3 | | | |
| " INVESTMENTS : | | | | |
| British South Africa Co.: 70,000 £1 Shares fully paid up £70,000 | | | | |
| 140,000 £1 Shares 3s. paid up 21,000 | | | | |
| " | £91,000 0 0 | | | |
| South African Company, 150 Shares of £1 each ... | 131 5 0 | | | |
| Consolidated Co., Bultfontein, 26,324 Shares of £1 each .. | 19,929 10 10 | | | |
| Anglo African Company 140 Shares of £10 each ... | 560 0 0 | | | |
| Griqualand West Company, 20,739 Shares of £10 each ... | 127,340 15 1 | | | |
| Ken lworth Estate and Village .. | 44,254 0 5 | | | |
| Waaldrift Coal Farm (½ share)... | 11,520 11 9 | | | |
| Sundry other Investments, including interest in Brazilian Mines | 101,868 9 0 | | | |
| " | 396,604 12 1 | | | |
| " MACHINERY AND PLANT : | | | | |
| General | 402,959 11 0 | | | |
| Electric Plant | 16,712 9 5 | | | |
| Mechanical Haulage Plant ... | 35,173 4 11 | | | |
| " | 454,845 5 4 | | | |
| " FURNITURE | 4,619 10 8 | | | |
| " STOCKS—Value of Coal, Merchandise, Produce, &c. | 36,256 0 4 | | | |
| " LIVE STOCK 1,222 HORSES AND MULES | 14,765 7 3 | | | |
| " PROPERTY—Offices, Residences, stores, Stables, Compound | 122,037 10 10 | | | |
| " SUNDY DEBTORS ... | 16,490 9 5 | | | |
| " DU TOIT'S PAN MINE SUSPENSE ACCOUNT ... | 28,523 5 4 | | | |
| " SHAFTS ACCOUNTS : | | | | |
| Value of Shafts at De Beers Mine .. | 61,230 10 10 | | | |
| Value of Shafts at Kimberley ... | 15,893 0 1 | | | |
| " | 77,123 10 11 | | | |
| " DEVELOPMENT WORKS : | | | | |
| Value of Development Works at De Beers Mine... | 54,791 6 9 | | | |
| Value of Development Works at Kimberley Mine | 22,569 14 0 | | | |
| " | 77,361 0 9 | | | |
| " STOCK OF BLUE GROUND... | 708,431 16 11 | | | |
| " DIAMONDS ON HAND | 288,463 4 4 | | | |
| " CAPE OF GOOD HOPE BANK | 55,188 19 0 | | | |
| " | £9,735,591 9 4 | | | |

We certify that we have examined the Books, compared the Vouchers, and checked the Balances of the De Beers Consolidated Mines, Limited, and that the above account is true and correct.

W. H. CRAVEN, Secretary.
WM. PICKERING, Accountant.

A. F. TANCRED,
H. F. E. PISTORIUS, } Auditors.

Statement of Profit and Loss, for the Year ending 31st March, 1890.

To CHARGES :

| | | | |
|----------------------------------|------------|---------|-------|
| Auditors Fees | ... £300 | 0 | 0 |
| Bonus Account | ... 4,622 | 10 | 0 |
| Directors' Fees (two years fees) | ... 15,300 | 0 | 0 |
| General Charges | ... 26,822 | 8 | 7 |
| Interest | ... 22,396 | 4 | 10 |
| Law Costs | ... 961 | 9 | 4 |
| Rent, Licences and Taxes | ... 25,898 | 11 | 1 |
| | <hr/> | <hr/> | <hr/> |
| | | £96,301 | 3 10 |

WORKING EXPENDITURE :

| | | | |
|---|---------------|---------|-------|
| Compounds | ... 32,648 | 7 | 2 |
| Maintenance of Property | ... 2,223 | 6 | 9 |
| Hauling (including £48 287 17s. 6d. for maintenance of Machinery) | ... 689,656 | 1 | 6 |
| Amount written off Development and Shafts | ... 36,954 | 17 | 10 |
| Washing (including £48,335 10s. 9d. for maintenance of Machinery) | ... 287,653 | 9 | 0 |
| | <hr/> | <hr/> | <hr/> |
| „ COMPENSATION ACCOUNT | ... ... ... | 3,341 | 0 |
| „ INTEREST ON DEBENTURES | ... ... ... | 170,518 | 2 6 |
| „ INTEREST ON DE BEERS BULTFONTEIN OBLIGATIONS (six months) | ... ... ... | 20,498 | 10 0 |
| „ EMPLOYEES' BENEFIT SOCIETY (Company's Contribution) | ... ... ... | 2,613 | 15 0 |
| „ INTEREST PAID TO LEASED COMPANIES | ... ... | 69,726 | 18 0 |
| „ RELIEF FUND | ... ... | 891 | 19 6 |
| „ INSURANCE FUND (on Company's Machinery and Property) | ... ... ... | 18,750 | 0 0 |
| | <hr/> | <hr/> | <hr/> |
| PROFIT ON YEAR'S OPERATIONS | ... 1,431,777 | 17 | 1 |
| | <hr/> | <hr/> | <hr/> |
| | £1,535,431 | 16 | 6 |
| | <hr/> | <hr/> | <hr/> |
| | £2,967,209 | 13 | 7 |

By Increase of Blue Ground on Floors ... £298,889 18 0
 „ Dividends on Investments ... 23,667 13 6
 „ Sundry Balances written off ... 3,094 2 10
 „ Diamond Account ... 2,641,557 19 3

By Balance of Profit for the year brought down 1,535,431 16

£1,535,431 16 6

By Balance brought down 1,255,098 1 3

„ Balance brought forward from last year 322,431 4 4

£1,577,529 5 7

By Balance 465,416 1 3

W. H. CRAVEN, Secretary.
 WM. PICKERING, Accountant.

We certify that we have examined the Books, compared the Vouchers, and checked the Balances of the De Beers Consolidated Mines, Limited, and that the above account is true and correct.

A. F. TANCRED,
 H. F. E. PISTORIUS, } Auditors.

TABLE OF STATISTICS

OF

De Beers Consolidated Mines, Limited,

SINCE ITS FORMATION IN 1888.

| MINE. | Year ending 31st March. | Number of Loads of Blue hoisted. | Number of Loads of Blue washed. | Number of Carats of Diamonds found. | Amount realised by Sale of Diamonds. | Number of Carats per Load of Blue. | Amount realised per Carat sold. | Amount realised per Load. | Cost of Production per Load. | Balance of Loads of "Blue on Floors" at end of year. | Dividend paid during year. | | | | | | | | |
|--------------------------------------|-------------------------|----------------------------------|---------------------------------|-------------------------------------|--------------------------------------|------------------------------------|---------------------------------|---------------------------|------------------------------|--|----------------------------|-----------------|-----------------|------------------|-----------------|---------|-----------------|------------|--------------------------|
| | | | | | | | | | | | Amount | £ | s. | d. | Amount | £ | s. | d. | Equal to | CAPITAL. |
| De Beers (Prior to Consolidation) | 1889 | 944,706 | 712,263 | 914,121 | 901,818 | 0 | 5 | 1·283 | 19 | 8 $\frac{3}{4}$ | 25 | 3 $\frac{3}{4}$ | 9 | 10 $\frac{1}{2}$ | 476,403 | 188,329 | 10 | 5 p. cent | £3,937,050 |
| De Beers and Kimberley | 1890 | 2,192,226 | 1,325,400 | 1,450,605 | | | | 1·09 | 32 | 6 $\frac{3}{4}$ | 35 | 7 $\frac{1}{2}$ | 8 | 10 $\frac{1}{2}$ | 1,576,821 | 394,786 | 10 | 10 p. cent | £3,947,865, 30 June, '89 |
| Bultfontein | .. | 462,078 | 354,674 | 97,713 | | | | 2,641,557 | 19 | 3 | ·27 | 32 | 0 $\frac{1}{2}$ | 8 | 7 $\frac{3}{4}$ | 4 | 5 $\frac{1}{4}$ | 465,320 | |
| Du Toit's Pan | .. | 379,184 | 271,026 | 60,512 | | | | ·22 | 52 | 6 $\frac{3}{4}$ | 11 | 6 $\frac{3}{4}$ | 4 | 10 $\frac{3}{4}$ | 868,835 | 394,895 | 10 | 10 p. cent | £3,948,955, 31 Dec., '89 |

De Beers Consolidated Mines, Ltd.

ANNUAL MEETING.

The second ordinary general meeting of shareholders in this Company was held at the office in Kimberley on Wednesday morning. There were present : Messrs. Henry Robinow (in the chair), C. E. Nind (and qq. Messrs. H. B. Hart, C. D. Rudd, and H. W. Dunsmure), M. Michaelis (and qq. Julius Porges, A. Beit, L. Breitmeyer, Julius Wernher, H. Eckstein, F. Eckstein, J. B. Taylor, and E. Wertheimber), and many others, Gardner F. Williams, Sir Charles Metcalfe, Messrs. B. Klisser, H. Kossuth, J. Graham, T. Wishardt, F. W. Matthews, L. Atkinson, G. H. Hull (and qq. H. M. Hull), J. Hampton, P. Peiser, F. A. Berthold, L. Frankenstein, M. Davis, Dr. Harris, F. J. Gardiner (qq. F. C. J. Bromwich, J. Morrogh M.P. Estate of J. Grewer, C. Meyer, and W. M. Smith), T. R. English, (and qq. R. English and T. Shiels), J. Lawrence, J. Hocking, J. J. Schoenraad, A. Warburg (and qq. S. Neumann and H. J. King) B. C. Kearns (and qq. S. Allkins), E. Bernheim (and qq. H. Mosenthal, W. Mosenthal, and P. Dreyfus), A. Wagner (and qq. E. Bruch), W. S. Felkin, L. C. Phillips, W. T. Graham, E. E. Wulff, E. R. Wells, J. J. Michau (and qq. D. J. Haarhoff and Mrs. A. S. Haarhoff), G. A. Bottomley, C. J. Roberts, P. Tallerman, A. E. Caldecott, G. McFarland, C. W. Melville, F. White (and qq. W. H. White), J. W. Philip, G. O. F. Harris, C. Dreyfus, H. Flugge, J. Munro (and qq. A. Downie), R. E. Wallace, (and qq. Mrs. E. Wallace), W. H. Craven (Secretary.)

Mr. Henry Robinow represented Hon. C. J. Rhodes, M.L.A., Mr. R. Hinrichsen, Francis Oats, Franz Voelklein, Paul Hardy, Patrick Sim, Otto Staib.

The Secretary read the minutes of former meetings, which were confirmed.

The Chairman said : In formally moving the adoption of the Directors' report and balance sheet, I must first say that I regret very much the absence of our Chairman, who is detained down in Cape Town on very important business. At the same time it will be a gratification to shareholders to know the honourable and responsible position he has accepted in being placed at the head of the Government of this Colony (applause). I have very few words to add to the report of the Directors. The balance sheet and also the General Manager's Report show every detail. The actual working during the past year shows a very good profit—in fact the profit on the working is over one million two hundred thousand pounds. Your stock of blue has been increased to over three million loads, besides a very large amount in lumps. This represents a value, after deducting all expenses for washing and everything, of over three and a half million sterling (applause). Perhaps in the next year's report there may be a decrease in the number of loads of blue shown on the floors, but at the same time the value will be much greater. Of course we have a large number of loads of Bultfontein and Du Toit's Pan ground now, which will not be so large next year ; but on the other hand the amount of Kimberley and De Beers blue will be much larger, because we can take away four or five loads of the poorer ground to one load of the richer ground. The General Manager explains that pretty fully in his report. The underground system, which is now complete, had to be reconstructed to a certain extent, and therefore it was necessary to take away a lot of reef and poor ground, and we had to extend the area of the underground workings in Kimberley somewhat to the West, and in De Beers to the Eastern portion and the old Gem Company, where the ground was not very profitable. As soon as this ground has been washed, however, we shall have the clean good blue which is now being taken out, and I think the yield will be as high as it ever has been. Referring to the balance sheet, you will find the investments are put down at £396,604. I might mention that this amount is fully represented by the investments held by your Company ; in fact at the present moment, although the market is very much depressed for every kind of investment, it represents fully fifty per cent. more than is put down in the balance sheet (applause). The cost of machinery and plant is put down at an amount which represents the whole of the machinery in the four mines, and the engineer's valuation of our machinery is much greater than the sum mentioned. Take one item, mechanical haulage. I see that during the last year at De Beers alone 1,200 trucks were purchased, which cost over £24,000, and the whole account in De Beers and Kimberley stands at £35,000. From the shaft account a very large amount has been written off, and this item now stands at £77,000. We have at De Beers an incline shaft nearly 900 feet long, and a new rock shaft over 850 feet down. In Kimberley we have the three shafts mentioned in the Manager's report, which are combined, the one leading into the other, and they go down over 1,040 feet. The Standard main shaft is down 1,200 feet, and the new rock shaft is down 1,020 feet and will be driven in at the level of 1,000 feet. There is one thing that I would mention. There has been a good deal of controversy in the newspapers about *'bris*

washing, and the position taken by the Company in reference to it. Of course you will understand that the *debris* which is claimed by the *debris* washers is really a very appreciable asset of the Company, and therefore the Directors could not see their way to throwing it open to the public. At the same time the Directors have wished to do everything possible to diminish the distress which is prevailing here on the Fields, and they have therefore come to an agreement with the *Debris Washers' Association* and the representatives of these people, to allow a certain number of machines to be used by deserving people, who have really some claim upon Kimberley and the Company. At the same time I would like to say that the statement about the amalgamation having thrown so many hands out of work has really been greatly exaggerated, and I may just mention the figures. In January, 1889, in all the four mines there were about 1,600 white hands employed. To-day there are in the four mines over 1,400, so that really the reduction is hardly 200—not quite 200 thrown out of employment through the amalgamation of the mines. Of course through the partial closing down of Du Toit's Pan and Bultfontein mines—that has been caused partly through the action of the landlords, who have never shown any disposition to give us any facility, but on the contrary have always thrown the greatest difficulty in our way, a great many of the men who were formerly employed at Bultfontein and Du Toit's Pan are now employed at Kimberley, but the actual number employed to-day is hardly 200 less than before the amalgamation ; and at the end of this year we shall even have more than were employed in 1889, because as soon as the new shaft in Kimberley is in full swing, we shall certainly require a great many more hands—probably bringing it up to 1,600 men to be employed (hear, hear). Our little village of Kenilworth has proved a great success, and I think all our people who are living there like it very much. Every effort is made for their comfort, and the sanitary arrangements are as good as the best they could have in Kimberley. The one thing that is from time to time raised up as a bugbear to shareholders—a bugbear which crops up especially at Home—is the outside mines. We have heard about these outside mines for the last twenty years, but they have not bothered us very much yet, and I don't think they will bother us in the future any more than they already have done. I see published a long report from the St. Augustine Mine, which is a very glowing one indeed (laughter). I am glad of that (laughter). Our old friend Finlason has been over six years at work to find six hundred pounds worth of diamonds [A voice : The expert is in the room—laughter] and the great value of this mine is that it is so very close to the Kimberley Mine ! Yes, it has always been very close to the Kimberley Mine ; and besides that they say it has the best machinery. Well, yes, of course, if machinery is the thing to prove a mine it is a very easy thing to get a very rich mine. Otto's Kopje has not received much benefit from the very good machinery which it had. I may mention that most of our amalgamations—in fact all our amalgamations are now practically at an end, and therefore the expense on that head, which during the last year was very high—an item of over £685,000, which was paid in cash out of the profits—will not again occur. The diamond market is in a very good state at present. It is the most sensitive, I think, of any market in the world. The Directors have I believe, got matters upon such a basis at the present moment that they have gained the confidence of the buyers—and it is a great thing that there should be implicit confidence between the buyers and the producers. We take the greatest care that the production shall be regulated by the demand, and also that the price shall not be put up excessively. We have come to a good mean now ; we think we know by experience the amount the market will stand, and we shall take care that the buyers at Home will always be able to rely upon the Company. In fact, to put it briefly, we are perfectly aware that the interest of the buyers at Home is practically the interest of this Company. (Applause). A matter which of course interests shareholders very much is that of dividends. I should not like to make any promises, but the prospects of the Company look very bright indeed, and I think we can certainly look forward, if nothing serious happens, politically, to affect the Diamond Market at Home, to paying very good and regular dividends. There is only one other matter to which I need refer now, and that is the staff of the Company. The Directors cannot help giving expression to the great satisfaction they have in recognising the services rendered to them by the Secretary, the General Manager, and also by the Chief Accountant, who has several times had to take over the position of Secretary when Mr. Craven was called away in the course of business ; and also the heads of departments and all the employés, who have rendered every assistance and worked in great harmony with the Directors. I move the adoption of the report. I shall be very glad to answer any questions.

Mr. Klisser seconded the resolution for the adoption of the report and balance sheet.

Mr. Montague Davis then went on to say that he found in the investment account several small items, such as "South African Company, 150 shares of £1 each.—£131 5s.;" and "Anglo-African Company, 140 shares, £560," coming before "Sundry other investments including interest in Brazilian Mines, £101,868 9s." Would the Chairman kindly give the meeting some idea as to what the £101,868 9s. referred ?

The Chairman : And the first items—

Mr. Davis said he called attention to that as being so infinitesimally small—£131 5s.—as compared with that big item of upwards of a hundred thousand pounds.

The Chairman : I may state that the 150 shares in the South African Company were shares

which we happened to have outstanding, and which have since been re-paid at a small profit on the amount at which we took them over ; and the same applies to the Anglo-African Company, both concerns having since been liquidated. The amount of £101,800 is sundry investments which the Directors thought proper to make, and which they are at liberty to make under the Trust Deed. I think it would be inexpedient for the Directors to give the exact details of those investments, as there are some of them which although made in the best interests of the Company—of course they were all made in the best interests of the Company—but some—also in the best interests of the Company—should not be made public. I believe I mentioned to Mr. Davis that that amount of £101,800 is more than doubly represented at the present day. (Applause).

Mr. Davis : In continuation I wish to know how much of that £101,800 is more than doubly represented by investments in Koffyfontein ? [“Oh ! oh !” and laughter].

The Chairman : I told Mr. Davis I thought it was for the interest of the Company not to mention any investment in detail.

Mr. Davis : May I ask the Directors if a portion of that £101,800 is represented by investments in Koffyfontein ?

The Chairman : I decline to answer that question.

Mr. Klisser did not suppose any shareholders came to the meeting with any hostile intent. But the reports seemed to put their position very clearly. The amount mentioned by Mr. Davis was a small matter, but whether it was invested in outside mines to gain control was certainly of interest to shareholders. (Mr. Davis : Hear, hear) No doubt it was for the benefit of the Company. It was brought forward more as a personal matter by Mr. Davis in regard to himself. (Mr. Davis : No, no ; not at all.) Certainly not on public grounds. (Mr. Davis : Certainly.) That might be Mr. Davis' idea—not his. But what he wanted to ask was not about the report—which he thought was quite satisfactory, as he had said—but whether the Directors could not find a more satisfactory mode of paying the dividends than hitherto. Not only did the present mode go against the good name of the Company, but it certainly damaged very much the price of shares. He had often heard it said that it took about ten weeks to pay last time ; and it was said outside that the Company was not able to raise the money for the purpose of paying dividends. They all knew that there was absolutely nothing in those things that were said, but it was certainly the feeling outside. If the Directors, therefore could find some other means of paying the dividend within a reasonable time after it was declared he thought the shareholders would be very much obliged to the Directors, and the price of shares and the reputation of the Company would be increased. (Hear, hear.)

The Chairman was very glad Mr. Klisser had brought the matter before the meeting, because it had been occupying the minds of the Directors for some time past. The delay in paying shareholders was really caused by the large quantity of transfers which had come in from Home. The transfers for this half-year were over 3,000, which had all to be registered in the books. The Directors had been thinking about the plan of closing the books at Home a month sooner than they were closed in the Colony—(hear, hear,)—and if it was found that they were legally entitled to do that, it would be done in future. (Hear hear.)

Mr. Peiser asked what number of *debris* washers it was intended to allow to wash in the area.

The Chairman thought Mr. Peiser had seen the report of the Association. The Directors had made an agreement with them to allow a hundred hand machines which would employ over 250 white hands, and it would greatly help to diminish the distress. Twelve would be allowed horse machines, and the others all hand machines.

Mr. Peiser asked whether it was the intention of the Company to wash the *debris* themselves.

The Chairman : At present, Mr. Peiser ? Or when do you mean ?

Mr. Peiser. Eventually.

The Chairman thought that was really a matter which would quite depend on circumstances. It would depend greatly on the advice of the General Manager when the circumstances arose which necessitated it. (Hear, hear.)

The Secretary having read the report of the Auditors, the resolution for the adoption of the Directors' report and balance sheet was carried unanimously, and amidst applause.

— The Chairman said the next business was the election of Directors. According to the Trust Deed the whole of the Directors retired with the exception of course, of the Life Governors. Two new nominations had been put in, viz. : Messrs. Francis Oats (nominated by Mr. E. R. Wells), and Julius Wernher (nominated by Mr. Geo. McFarland).

Mr. Wells had much pleasure in proposing that the following gentlemen be elected Directors for the ensuing year : Messrs. C. E. Nind, H. Robinow, G. W. Compton, Sir Donald Currie, M.P., Sir Hercules Robinson, Messrs. F. Baring-Gould, C. E. Atkinson, R. English, R. Hinrichsen, Woolf Joel, T. Shiels, J. Morrogh, M.P., H. Mosenthal, C. Meyer, Julius Wernher and Francis Oats.

The Chairman then read the names of all the retiring Directors.

Mr. Klisser, before the resolution was put would like to observe that the whole matter of being a Director of that Company was in a very unsatisfactory state. It was men of skill and ability and business capacity that they wanted, and as far as he could see by the report, the Company out here was virtually managed by four Directors. With the exception of Mr. Rhodes who was a Life Governor, he believed the four gentlemen who had signed the balance sheet and report had done all the hard work ; while the other gentlemen had been at Home and he presumed had drawn equal salaries. The hardest work they had had, had been to go to the office and sign a few cheques. He did not see why they wanted twelve Directors at Home, but if the Board thought fit he should vote for it ; only he would add that every Director should be compelled to reside four months at least in the year in Kimberley as long as he was a Director of the Company, so as to enable them to afford assistance in any matters that might be brought forward.

The Chairman observed that the Directors in London had rendered most valuable services in financial matters.

Mr. Klisser : Yes there are one or two of them—I'll acknowledge that.

The Chairman said the proposition was one which the Directors would very gladly see adopted, because they found the work of such a large Company was very onerous for the small number of Directors living out here during the past year. At the same time according to the Trust Deed he was afraid they could not pass any such resolution. It was really changing the constitution of the Company, and the terms of the Trust Deed as to the conditions on which they were elected. It said that at least four should reside in London, but it did not say that not residing in Kimberley should be a disqualification. So Mr. Klisser's resolution would really be creating a disqualification of Directors, which could not be done without a special meeting.

Mr. Klisser : Would you take it as a suggestion, and call a special meeting ?

The Chairman would be very glad to take it as a suggestion to the Directors and it would receive full consideration.

The Chairman then put the resolution for the election of the Directors proposed (which was really the re-election of the old Board, substituting the names of Messrs. Wernher and Oats for those of Messrs. Porter Rhodes and Newberry) and it was agreed to unanimously.

Mr. J. W. Phillip said when he last spoke in that room it was not by any means so pleasant a meeting as the present—but that was all past and gone. He must say the statement was eminently satisfactory. They could not look for a better statement. He quite agreed with Mr. Klisser in reference to the Directors. The Trust Deed provided that four Directors should reside at Home, but instead of that at the present time three fourths of them were at Home. It might be a very serious matter in case of illness of one or two of the Directors here to carry on the Company, and he certainly thought some provision ought to be made for such a contingency. Then again he hardly thought the Directors on the other side should be treated in the same way as those here, who had to bear all the burden and brunt of the work. The Directors here gave up nearly all their time to the affairs of the Company, and he begged to move that the same vote be given to the Directors as last year, but that in addition £1,500 be voted to be divided amongst the Directors here, as they may arrange. He certainly thought they had worked very hard in the interests of the Company. He was very sorry Mr. Rhodes was not here, Mr. Robinow had acted excellently, but he should have liked to have heard a few prophetic words from Mr. Rhodes as to the future of the Company. There was a statement showing forty per cent. profit, and the shareholders would have been pleased to have had Mr. Rhodes or Mr. Robinow give them an idea as to whether they might expect more at the next half-yearly meeting. The Company was at the present time rather undercapitalised for the immense holdings, and the shareholders had to suffer. He hoped out of the large earnings of the Company the shareholders would get a larger share, and that the debts for purchases by the Company would not be piled up for the benefit of future shareholders.

Mr. Davis had much pleasure in seconding the resolution.

After some little discussion, the motion was agreed to unanimously.

The Chairman thanked the shareholders on behalf of the Directors and on his own behalf, adding that there would be no more expenses for acquiring properties out of the profits. As he did not want to make any promises, he had said that they could look forward to having larger dividends paid during the present year. Promises were always dangerous things to make and therefore he had only said that they could look forward to larger dividends. The Directors here had always done their best in the interests of the Company, and had given most of their time to it.

It was a great pleasure to them to have the management of a Company which was in such a prosperous condition now, and had such a very bright future before it (applause).

Mr. Davis moved that Messrs. H. F. E. Pistorius and A. F. Tancred be re-elected Auditors, and their remuneration fixed at £250 each.

Mr. Kossuth seconded.

Mr. McFarland asked what the remuneration was last year.

The Chairman replied that it was £150 each, but that was for the old De Beers Company alone, and since the amalgamation there was an immense amount of additional labour.

Mr. McFarland said the amount surprised him because it was so small. The labour was great and the auditors were the safeguards for the shareholders. They stood between the Directors and the shareholders. He would move as an amendment that they have £600 each.

The Chairman : Each ?

Mr. McFarland : Yes—£600 each. (A laugh). He was not often liberal with other people's money. There was a large number of gentlemen gathered together who were quite content to vote large sums to gentlemen who resided in London, and he quite agreed that a number of those gentlemen financially had done a great deal for the Company ; although some of them, from past experience, had done no single thing more for the Company than Mr. Kossuth, who seconded the proposition (loud laughter). When he found a number of business men in such a liberal mood, he thought they should be liberal to the men who did the work—never mind the hangers on to the Company. The Auditors had to do a very large amount of work.

In answer to Mr. Wagner, the Secretary said he did not think any two men could do the auditing properly under three or four months work with eight hours a day each. Really there should be an audit office established. The audit would never be satisfactory until that was done as it ought to be.

Mr. Davis increased the amount in his resolution to £300 for each auditor, and this was agreed to, Mr. McFarland's amendment finding no seconder.

On the motion of Mr. Wells, seconded by Mr. Wagner, the meeting left it to the Directors to fix the amount of the bonus to be paid to the employés of the Company.

Mr. Nind brought up the question of a grant to the Hospital. Last year there was a grant of £1,000. That was liberal but not too liberal, for the Hospital was a grand institution. He was sorry to say that the funds had been steadily declining, although the present Government had been good enough to wipe off the balance standing against the Hospital for money advanced in previous years. So that at present the Hospital had a clean bill of health, although the income had been steadily falling off and they had had to cut down expenses in every possible way. In fact the Hospital was the most economically managed institution of the kind in the whole of South Africa. He hoped some shareholder would bring forward a proposal that a grant should be made (hear hear).

Mr. McFarland moved that the same grant be made as last year ; he would also ask the Directors to take instructions from the meeting as to a grant to the Public Library—say £250.

The Chairman moved that £1,000 be granted to the Hospital, and £250 to the Public Library.

Mr. Schoenraad moved that £1,500 be given to the Hospital.

Mr. Jacobs seconded.

Mr. Frankenstein thought the votes should be taken separately. Some people might like to support the Hospital and not the Library. The poor people got no benefit from the latter. They could go there and read the papers, but they could not get books out. The only way a poor man could improve his mind there was by reading the newspapers (a laugh).

Mr. Lawrence would move a further amendment that £1,500 be voted, and that it be left to the discretion of the Directors to apportion it among the Hospital, the Library, and such other charitable institutions as they might think fit. The Nazareth House might well be allowed something. [A voice : That's more use than the others.]

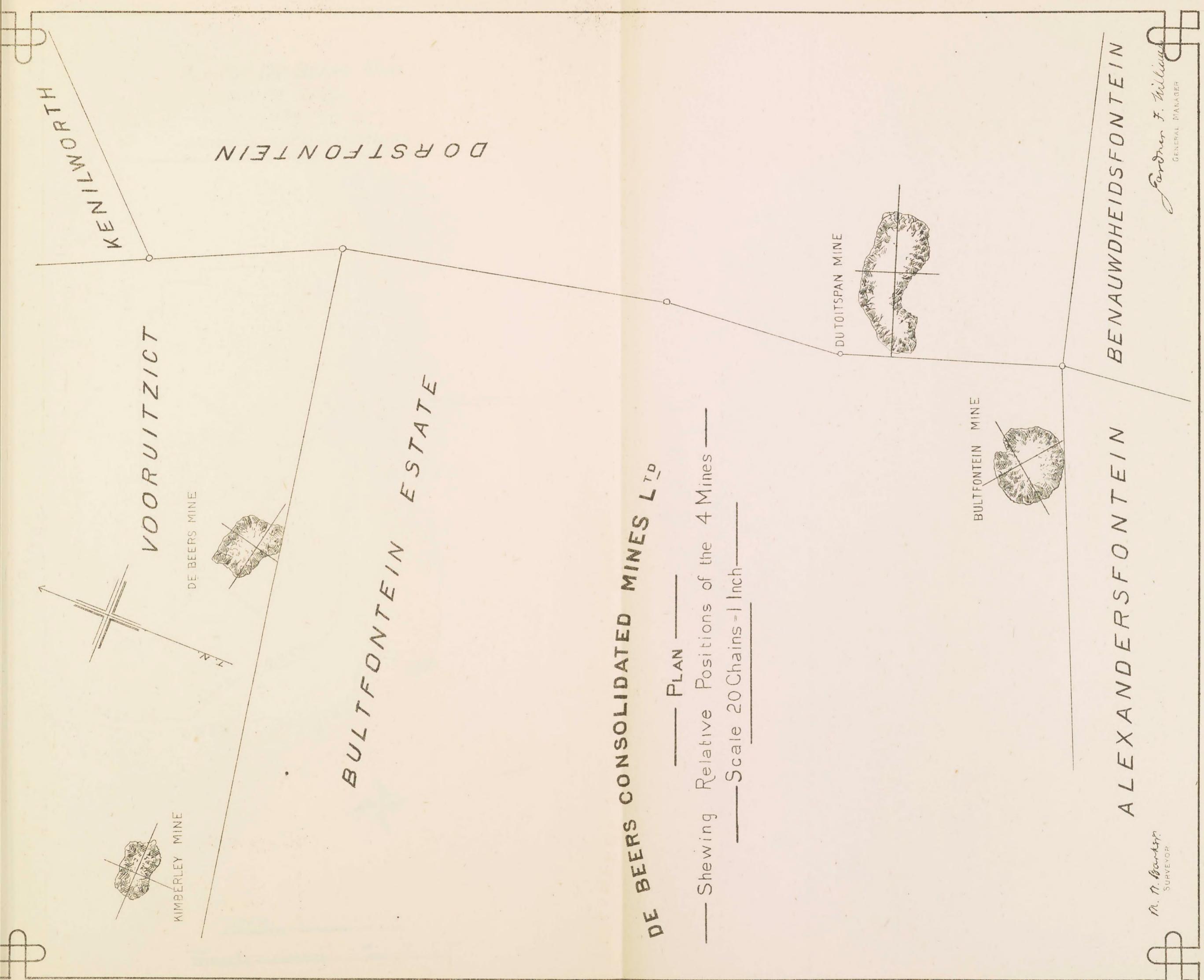
The Chairman said they had already given a donation to the Nazareth Home, in fact there were very few institutions to which the Company had not contributed in one form or another.

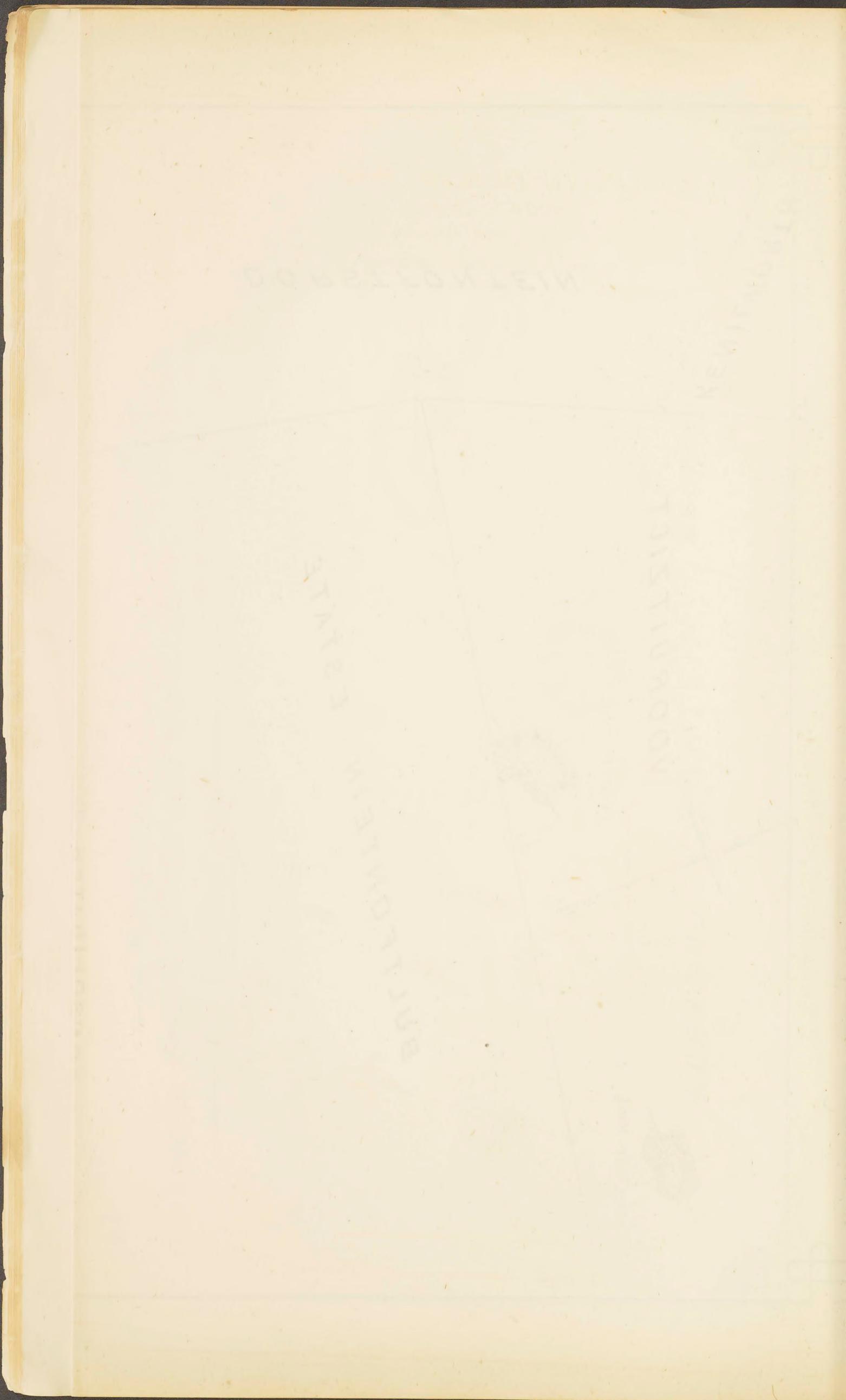
After some conversation Mr. Schoenraad withdrew his amendment, and it was resolved to vote £1,000 to the Hospital and £250 to the Library.

The Chairman : There is nothing else for me to do but to thank you for your attendance. The dividend warrants will be posted next mail to England, and during the same week they will be sent out to Shareholders in South Africa.

A vote of thanks to the Chairman brought the meeting to a conclusion.

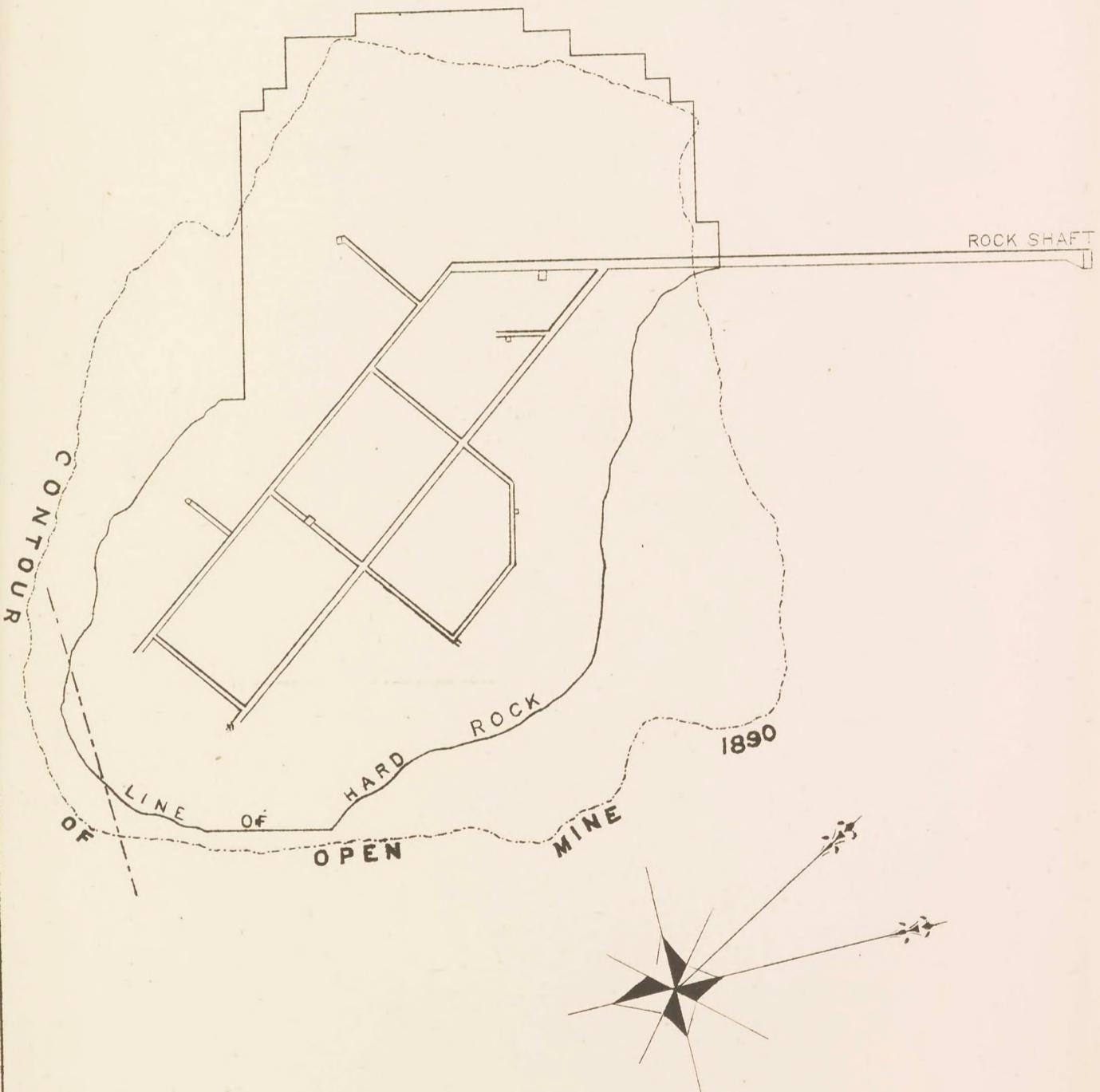






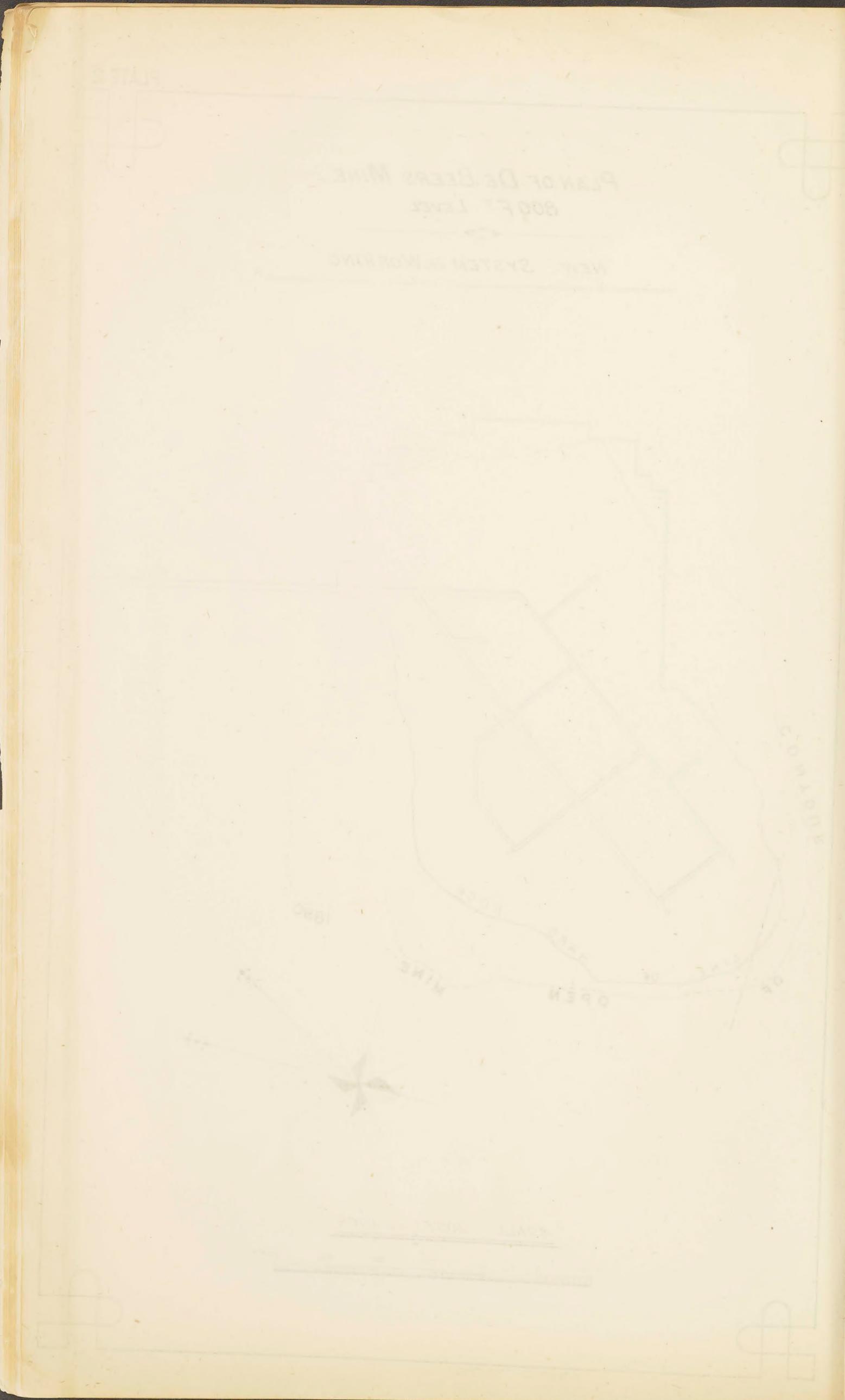
— PLAN OF DE BEERS MINE —
800 FT LEVEL

— NEW SYSTEM OF WORKING —



SCALE 200 FT TO AN INCH

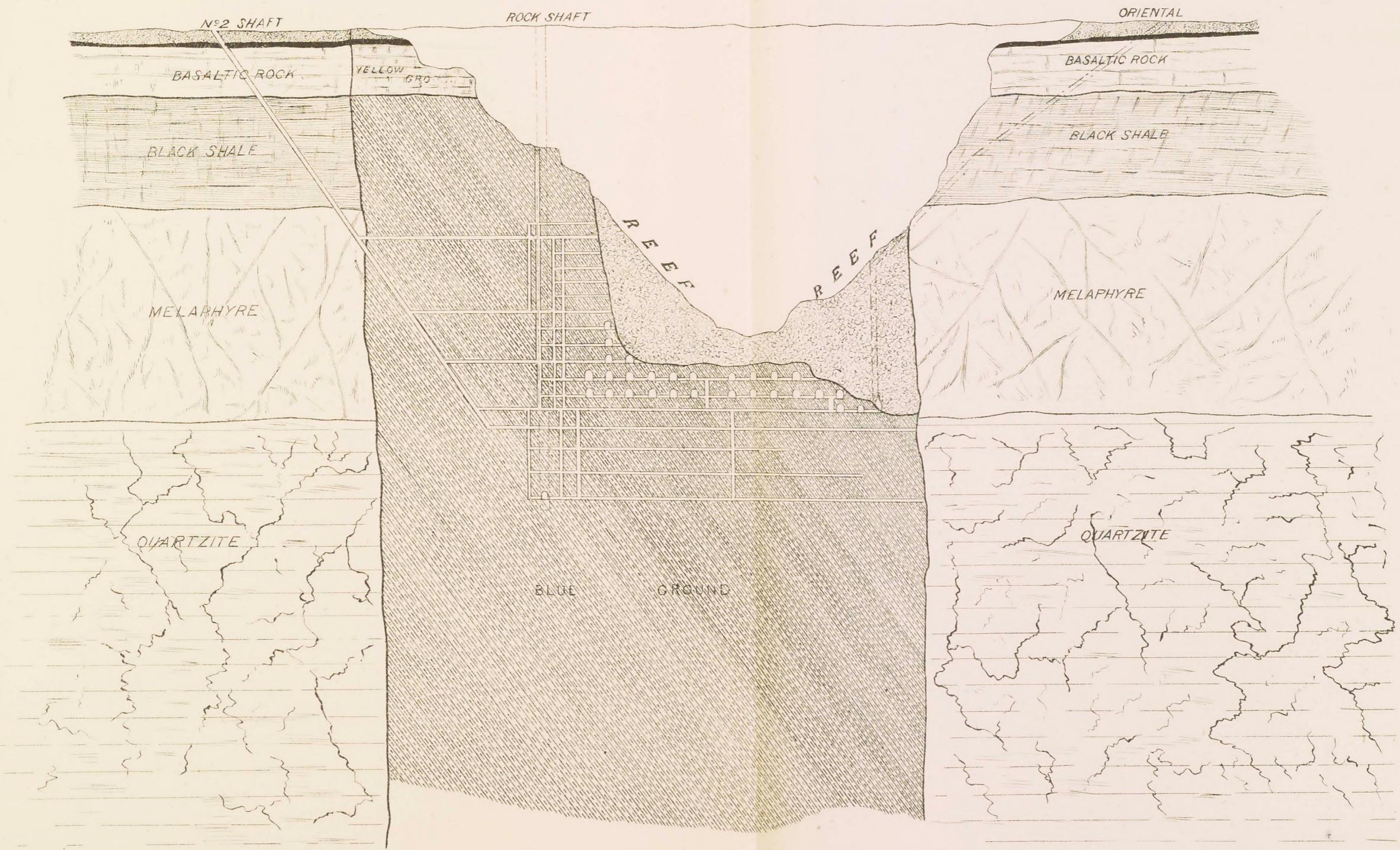




DE BEERS CONSOLIDATED MINES LTD

SECTION OF DE BEERS MINE,

LOOKING NORTH

Scale 200 Feet to an Inch

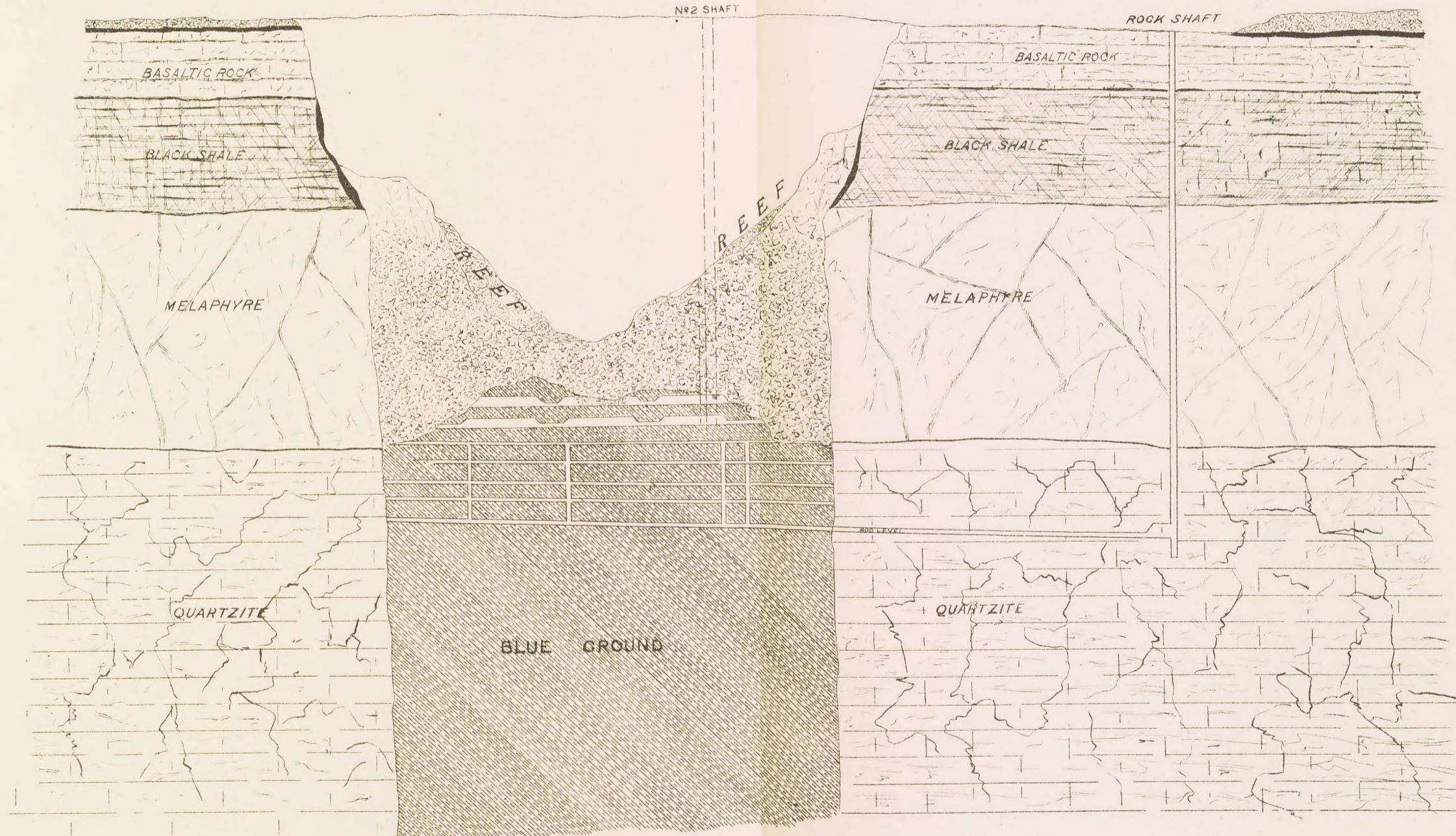
Office of
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1861-1862

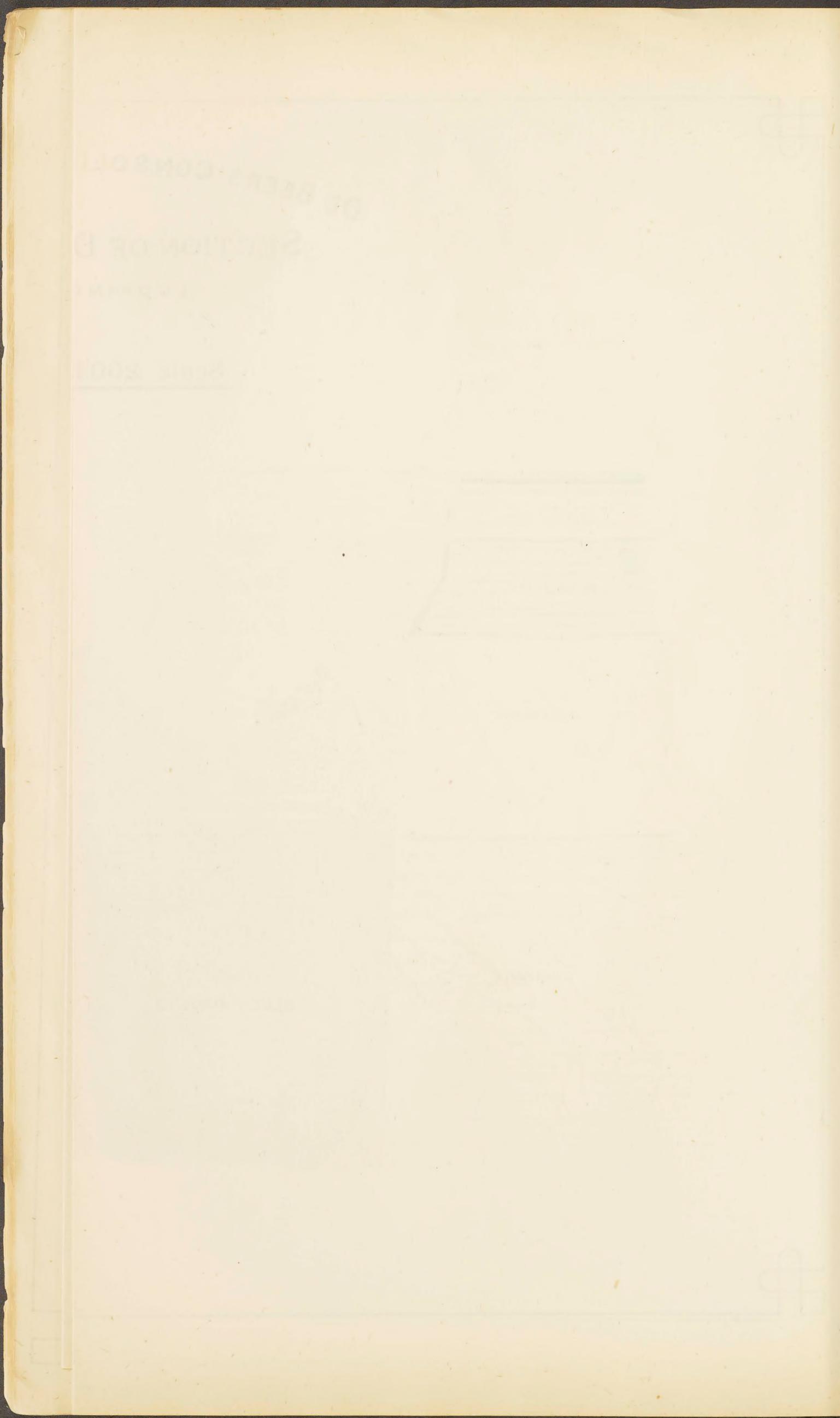
DE BEERS CONSOLIDATED MINES LTD.

SECTION OF DE BEERS MINE

LOOKING WEST

Scale 200 Feet to an Inch

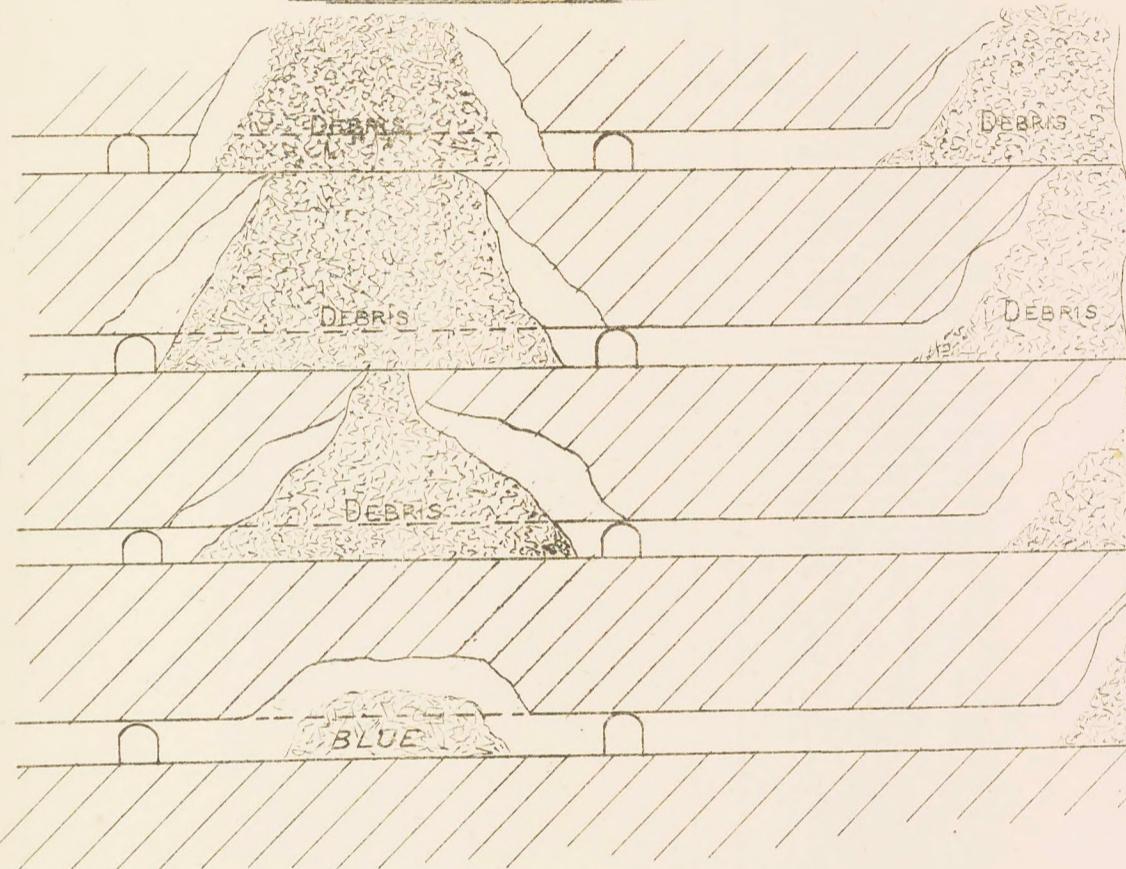




— PLAN —

— SHEWING METHOD OF WORKING —

— DE BEERS MINE —



HARD ROCK

HARD ROCK

HARD

PLAN

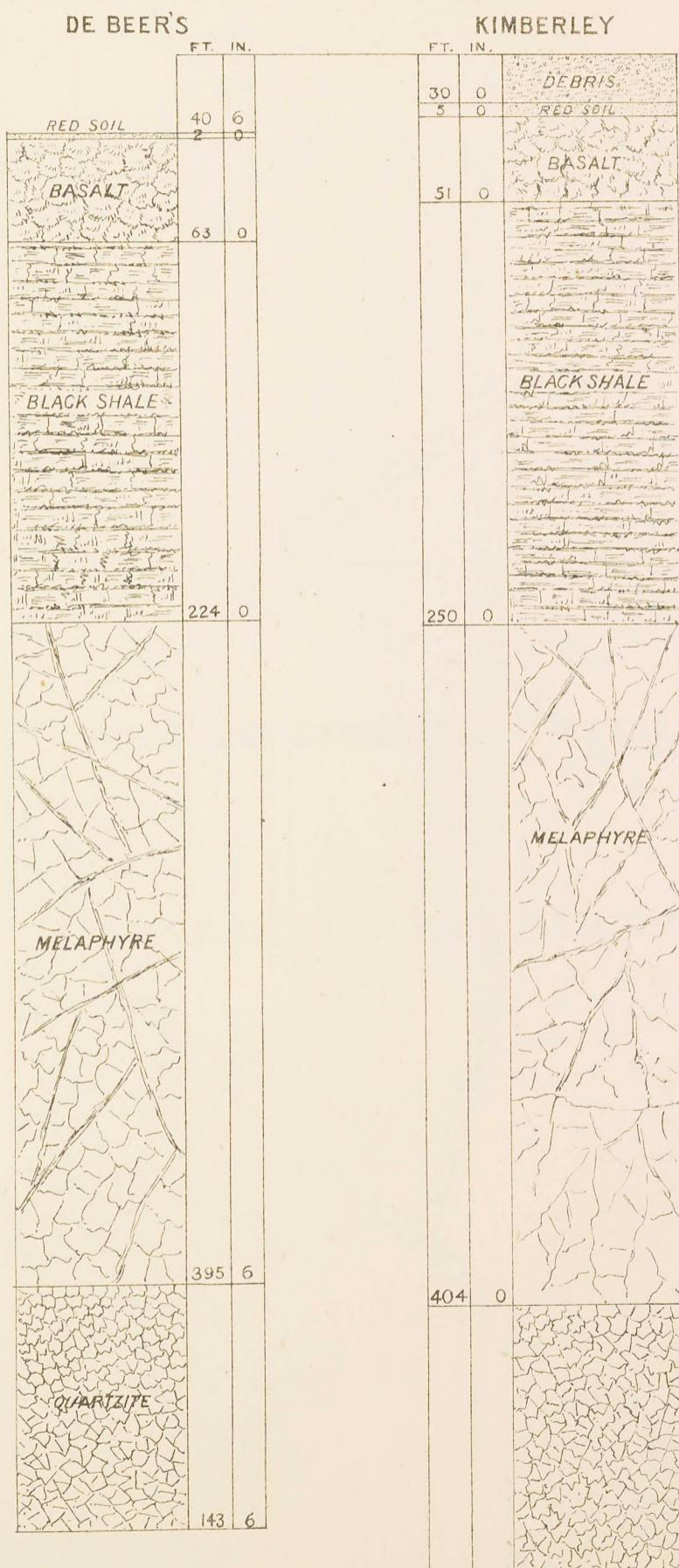
SCALE

10 5 0 20 30 40 50

Geological Sections of
DE BEER'S AND KIMBERLEY ROCK SHAFTS.

Scale.

100 50 0 50 100 200 300

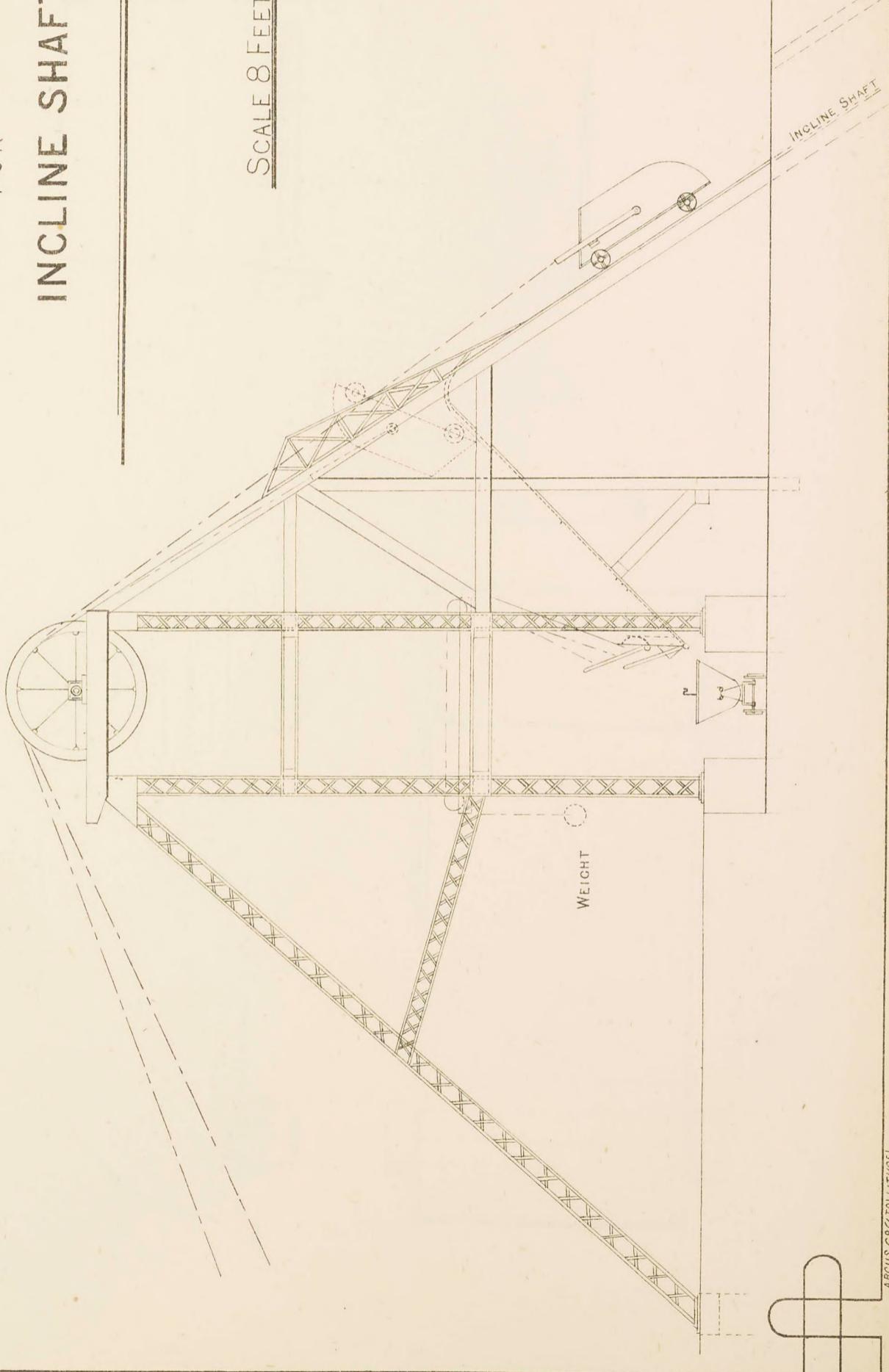


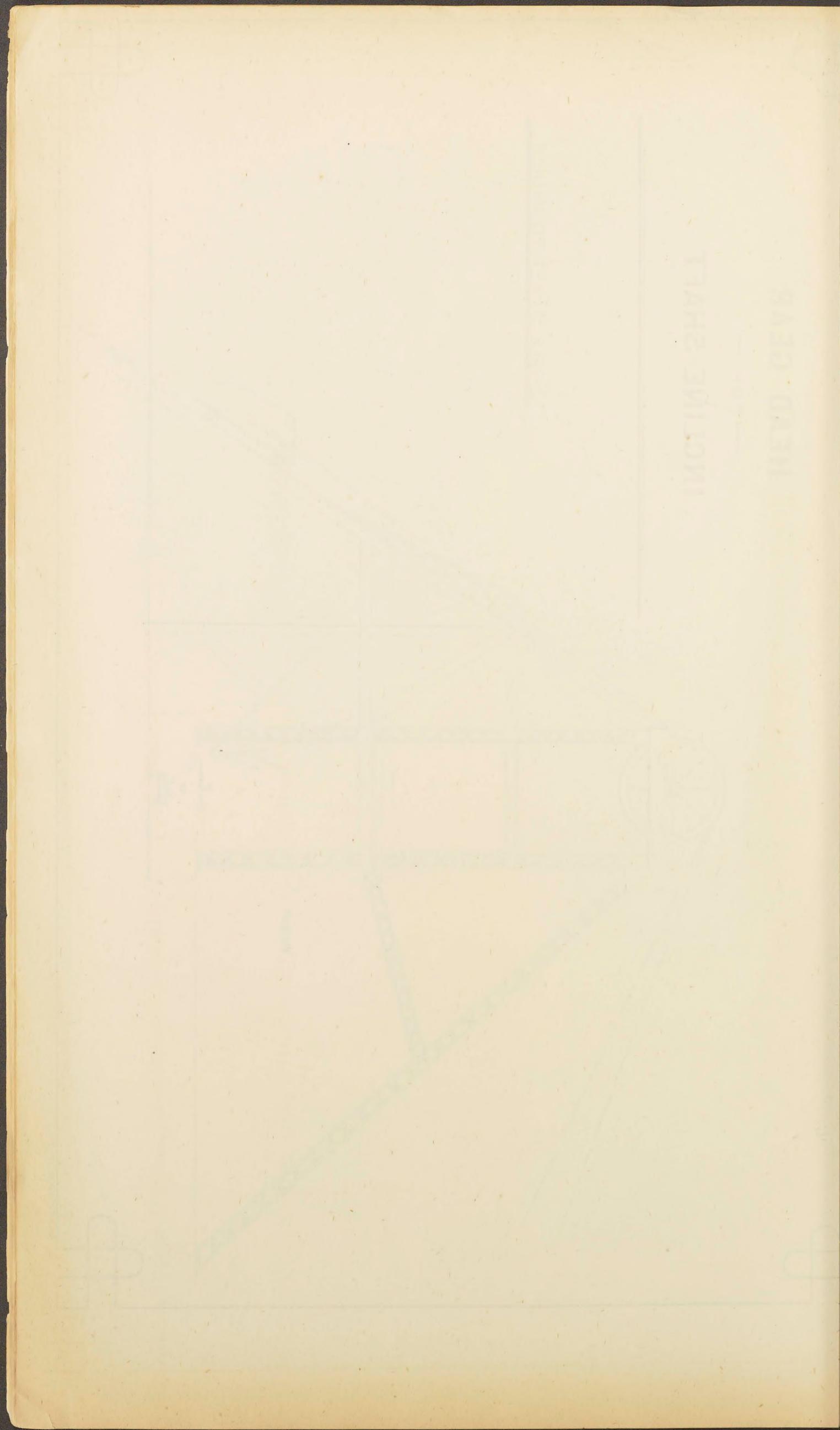
HEAD GEAR

— FOR —

INCLINE SHAFT

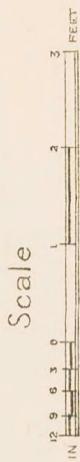
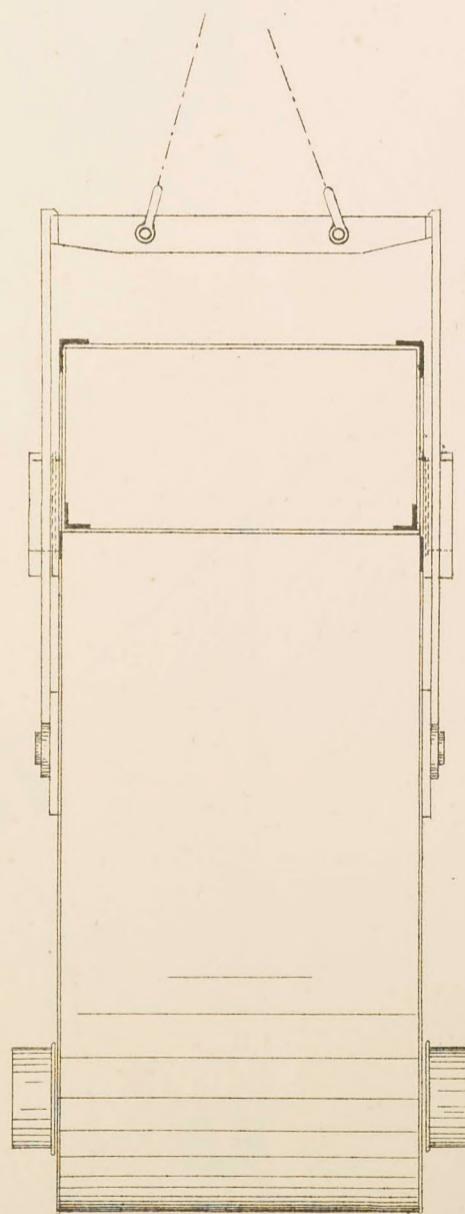
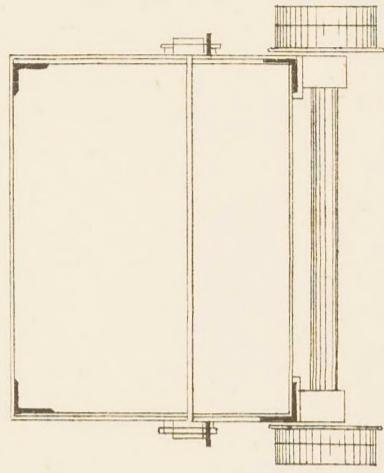
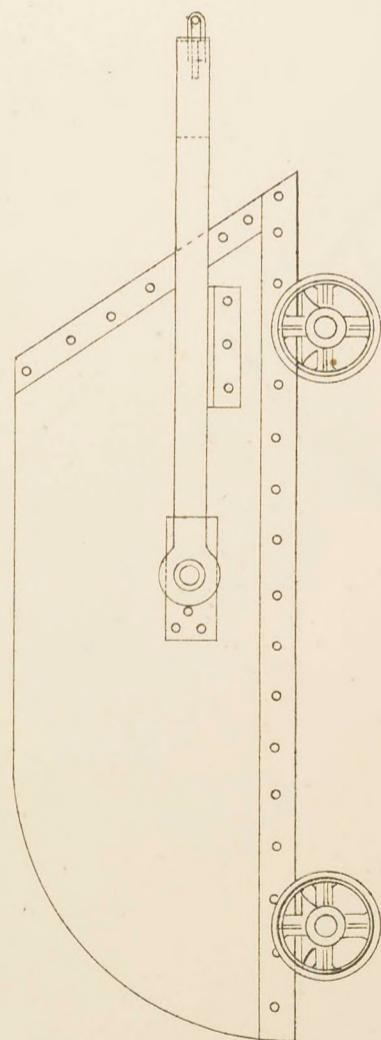
SCALE 8 FEET TO AN INCH

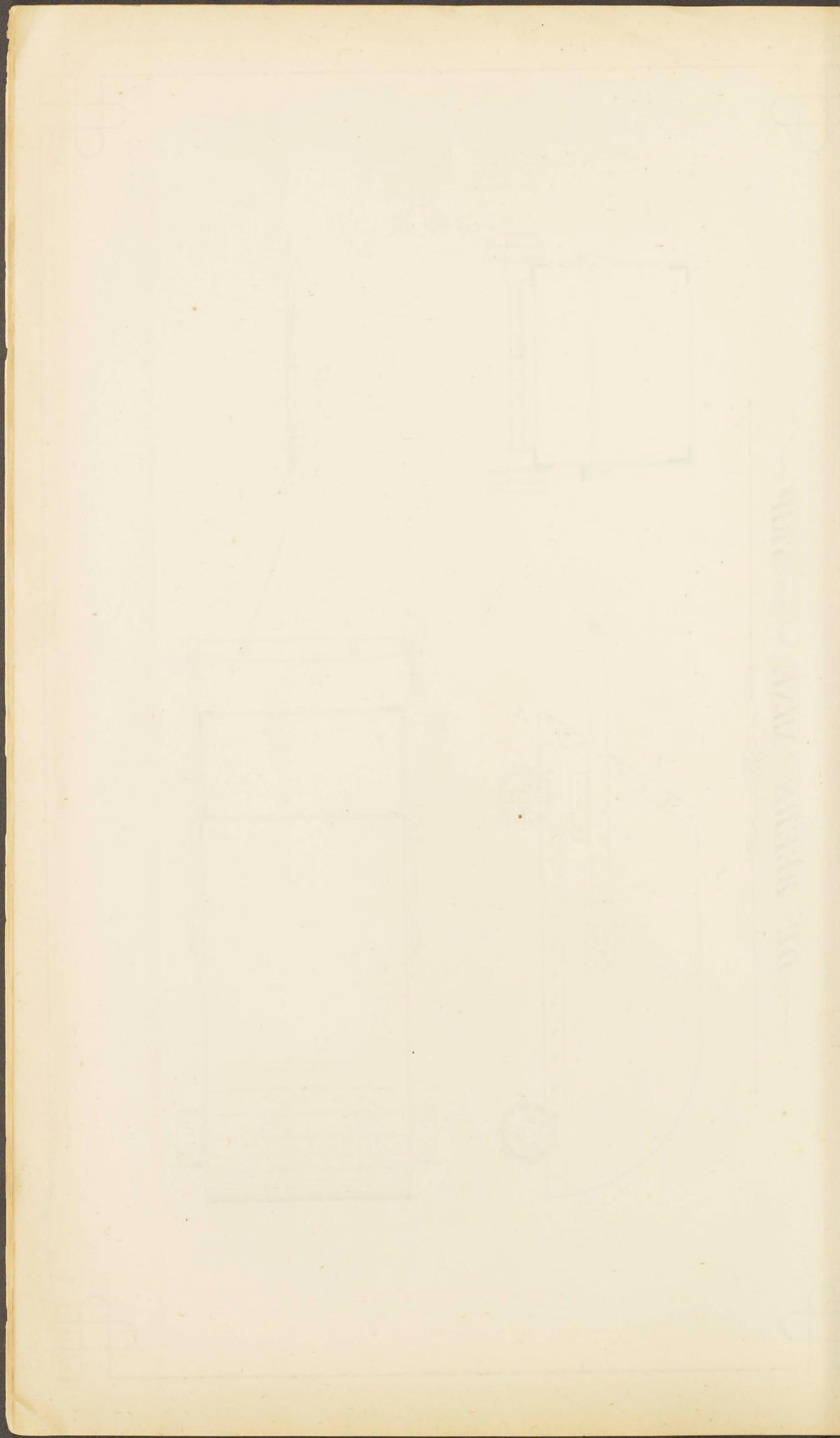


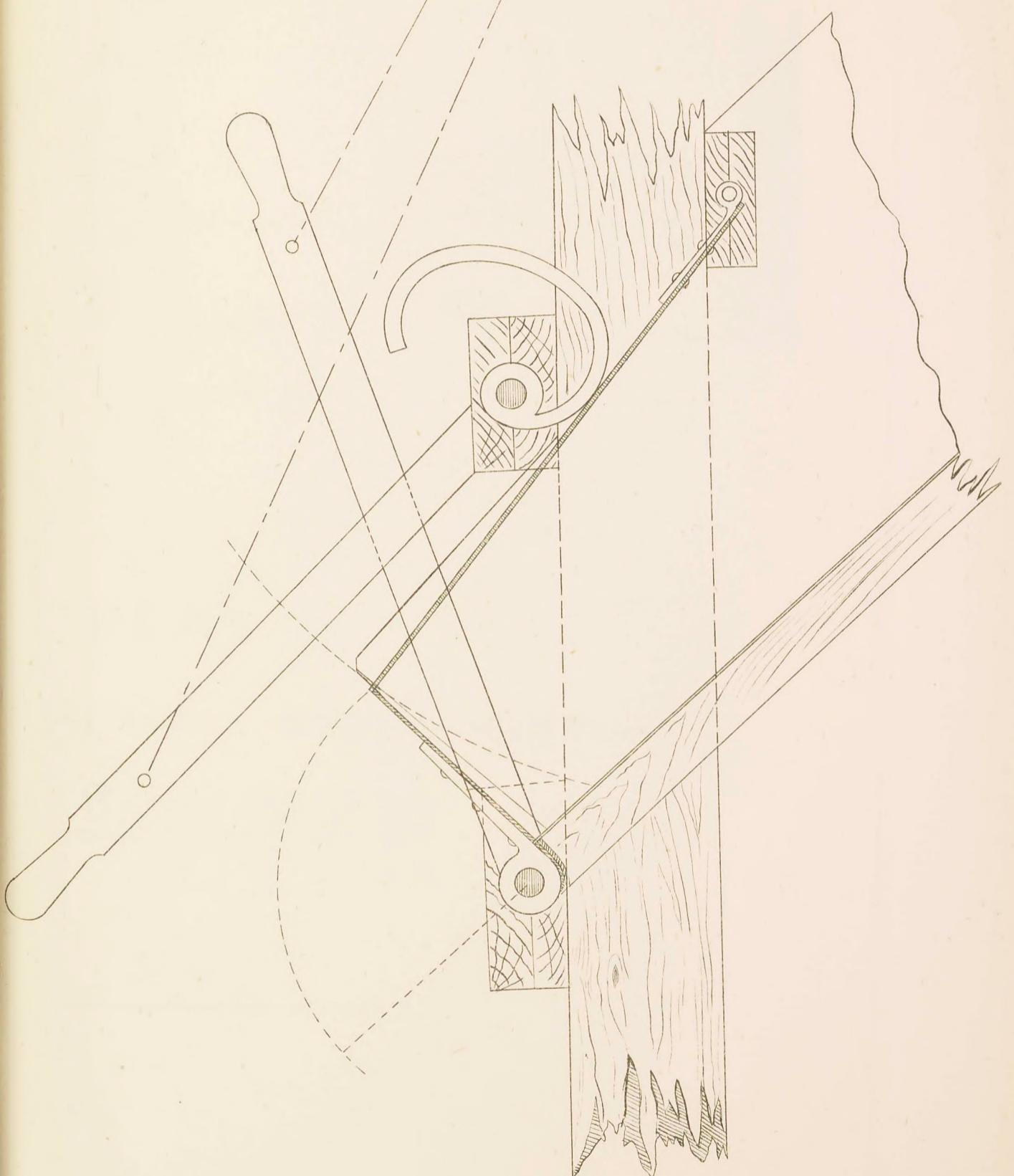


— DE BEERS MINE — SHIP —

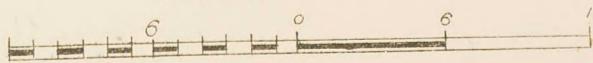
132

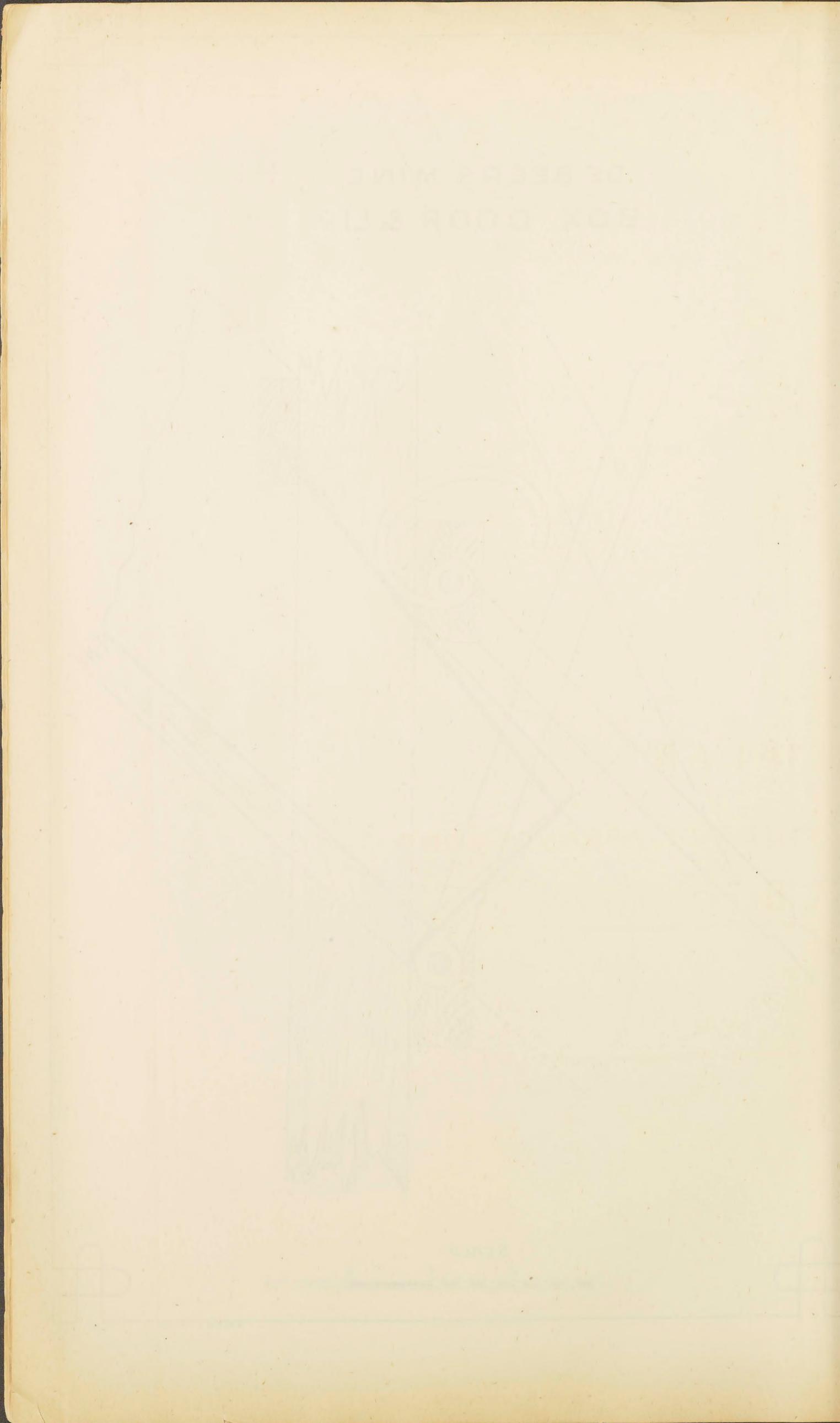


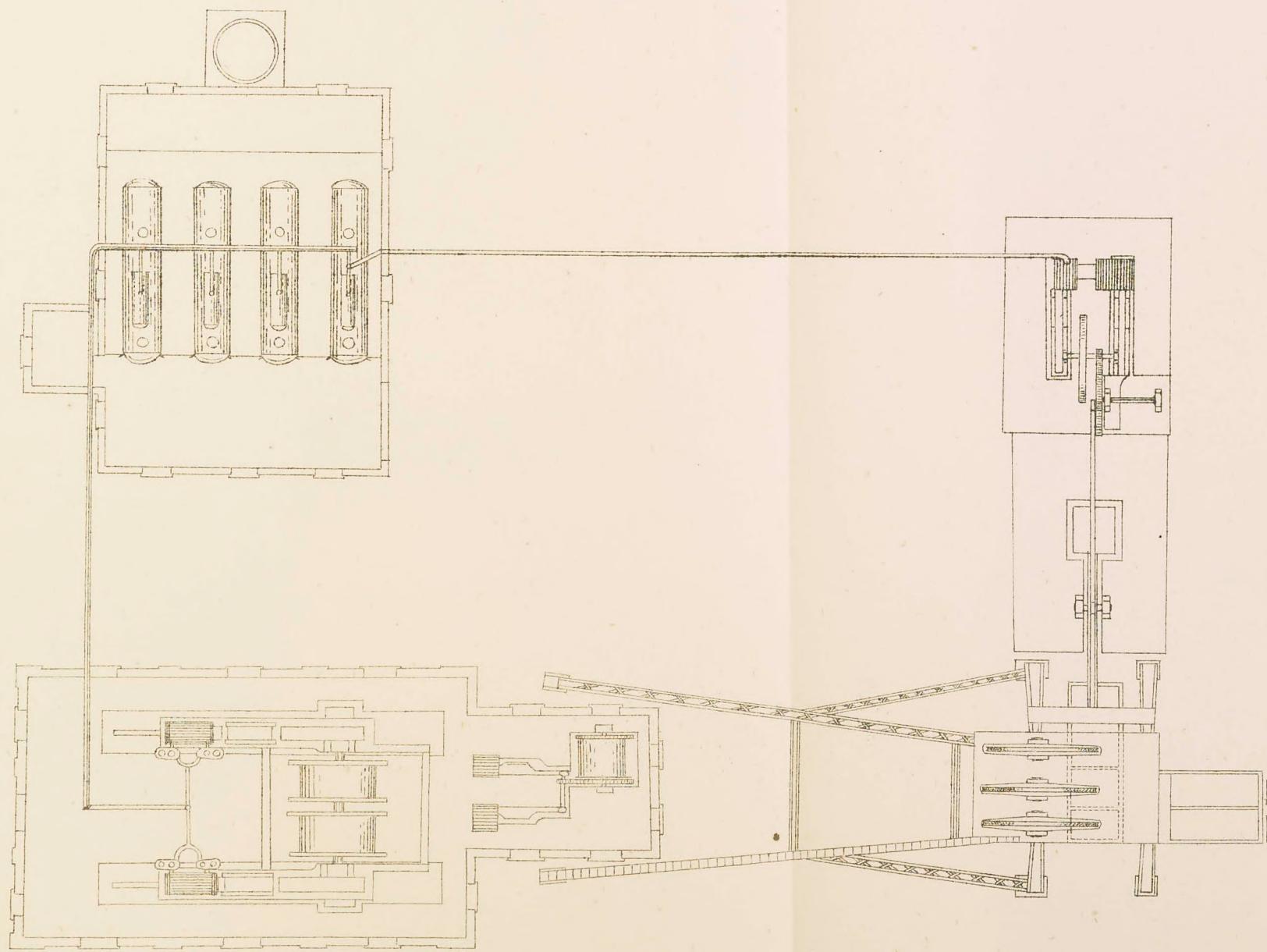
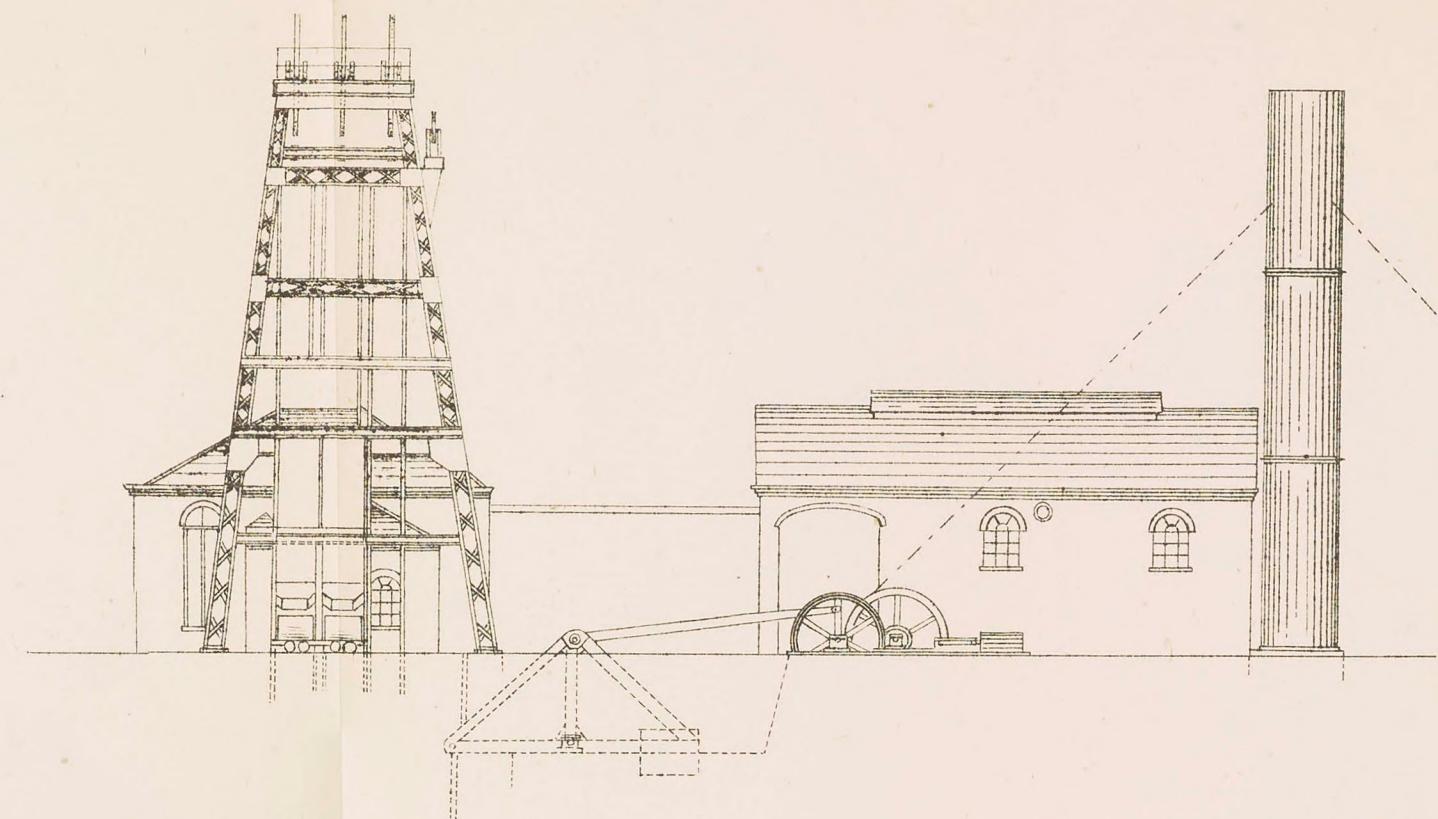
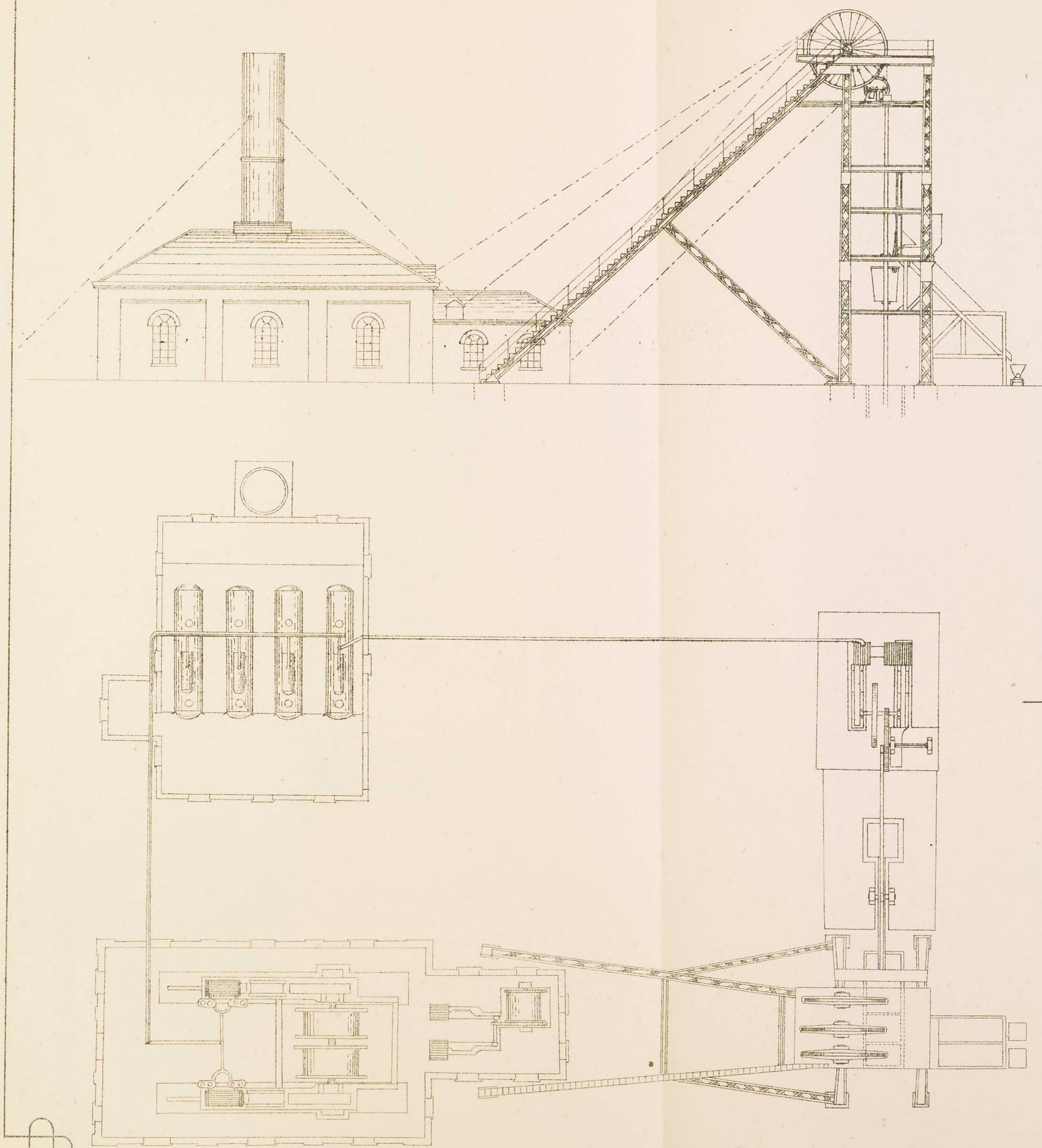


DE BEERS MINE
BOX DOOR & LIP

SCALE





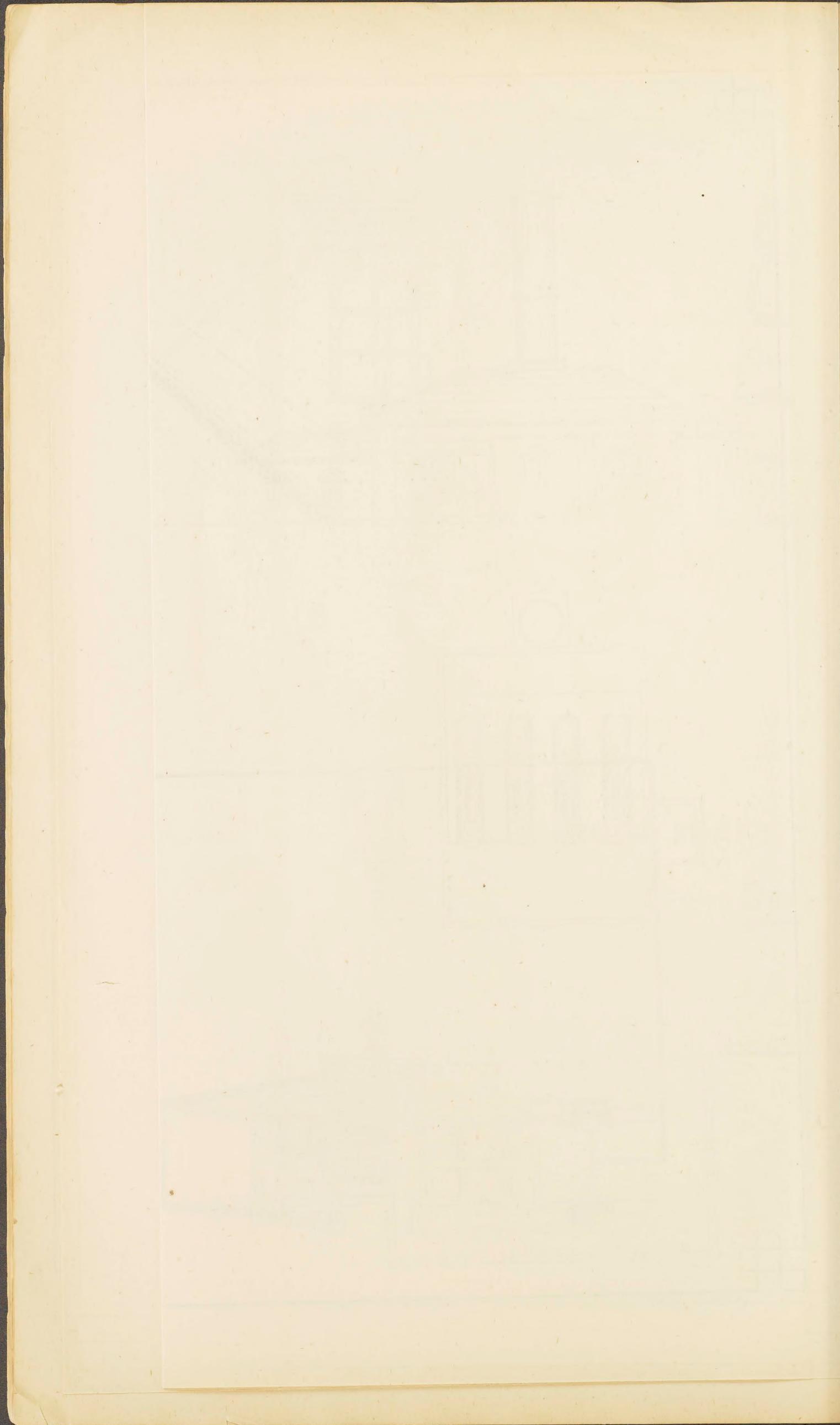


— PLAN —

— ROCK SHAFT SURFACE ARRANGEMENT. —

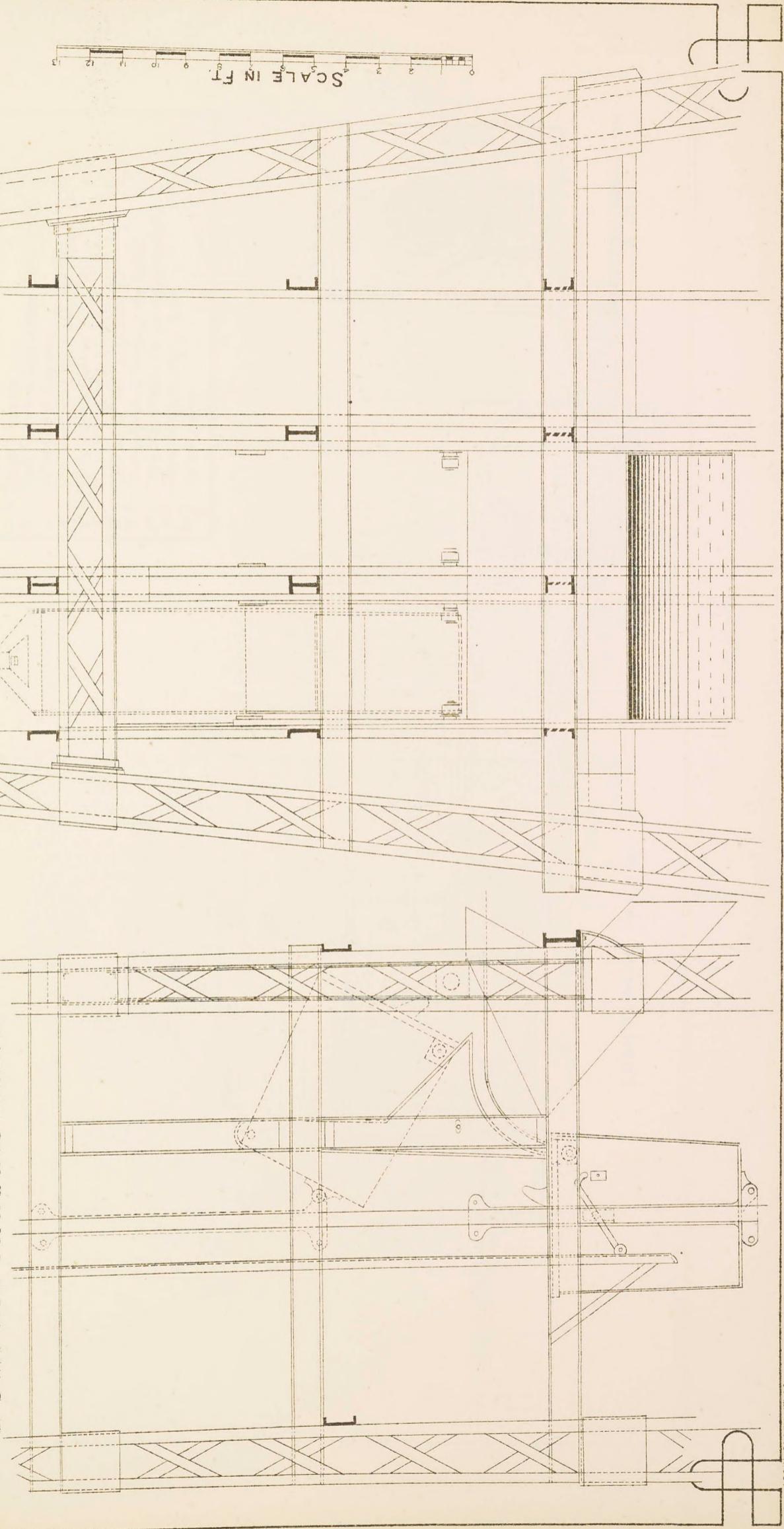
— DE BEERS MINE —

Scale.
FT 10 0 10 20 30 40 50 FT

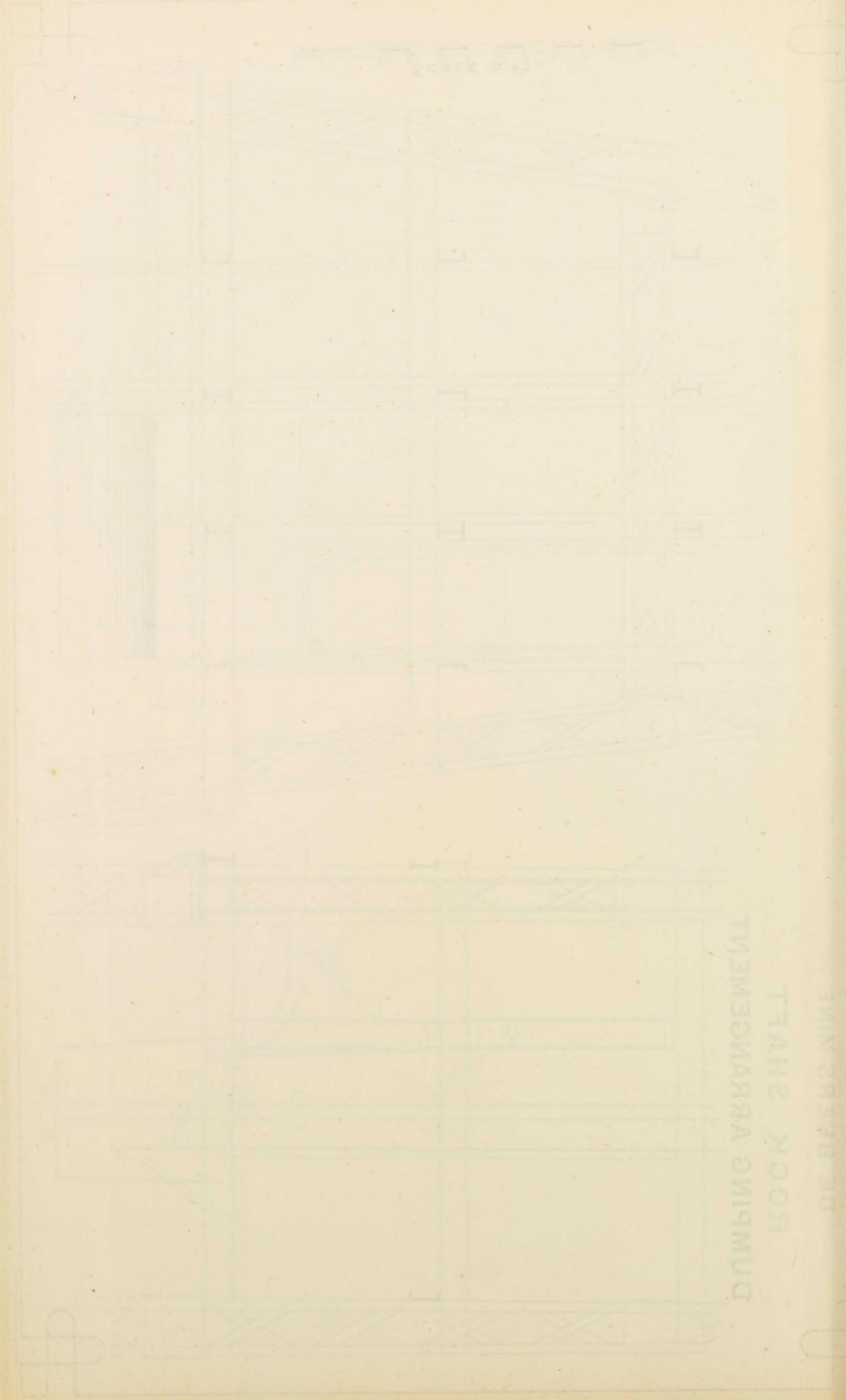


DE BEERS MINE

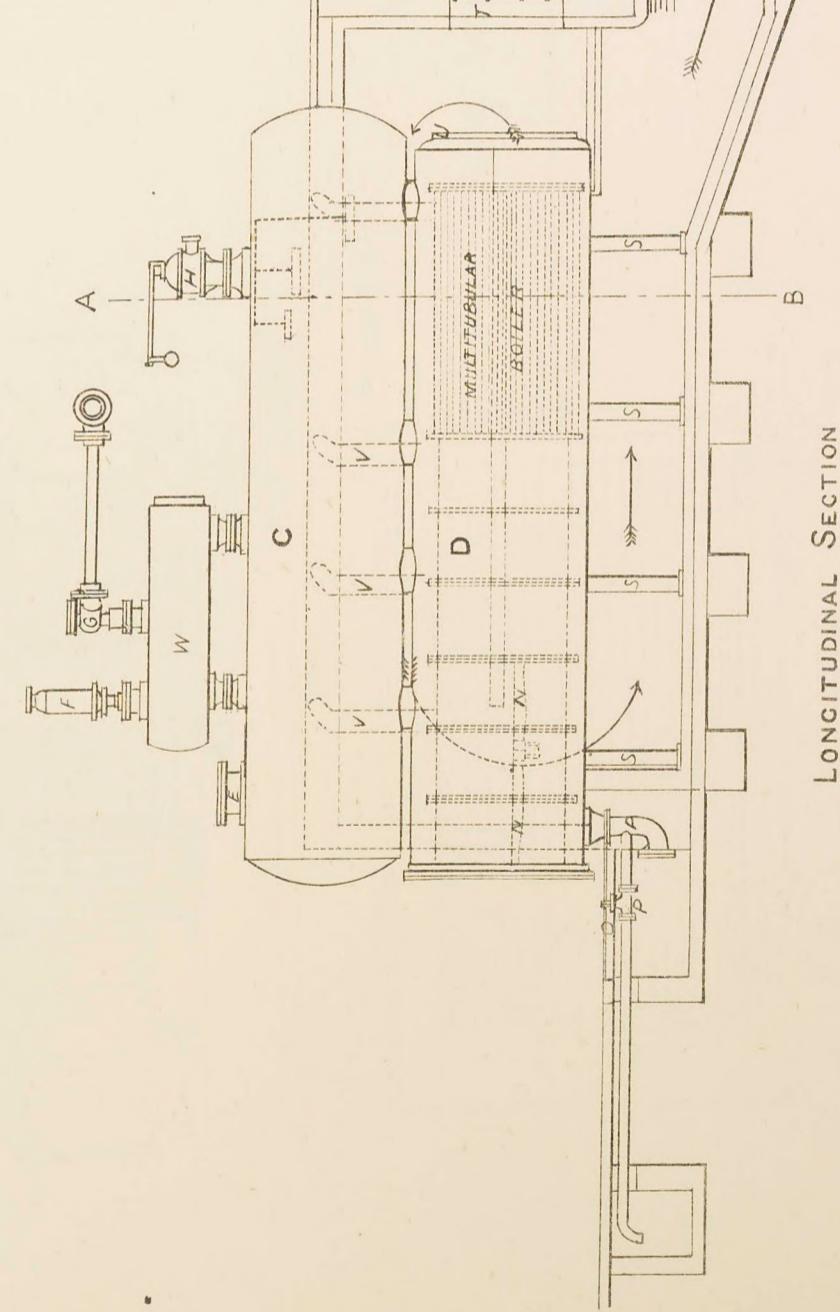
ROCK SHAFT
DUMPING ARRANGEMENT



ДОМЫЩЛЯ ВЛАДИМЕРСКИЕ
BOOK OF HANSES



FAIRBAIRN BEELEY BOILER

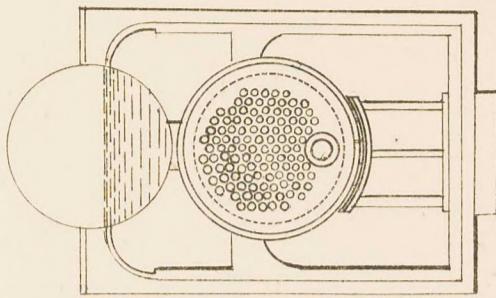
Scale $\frac{1}{6}$ -1 Foot

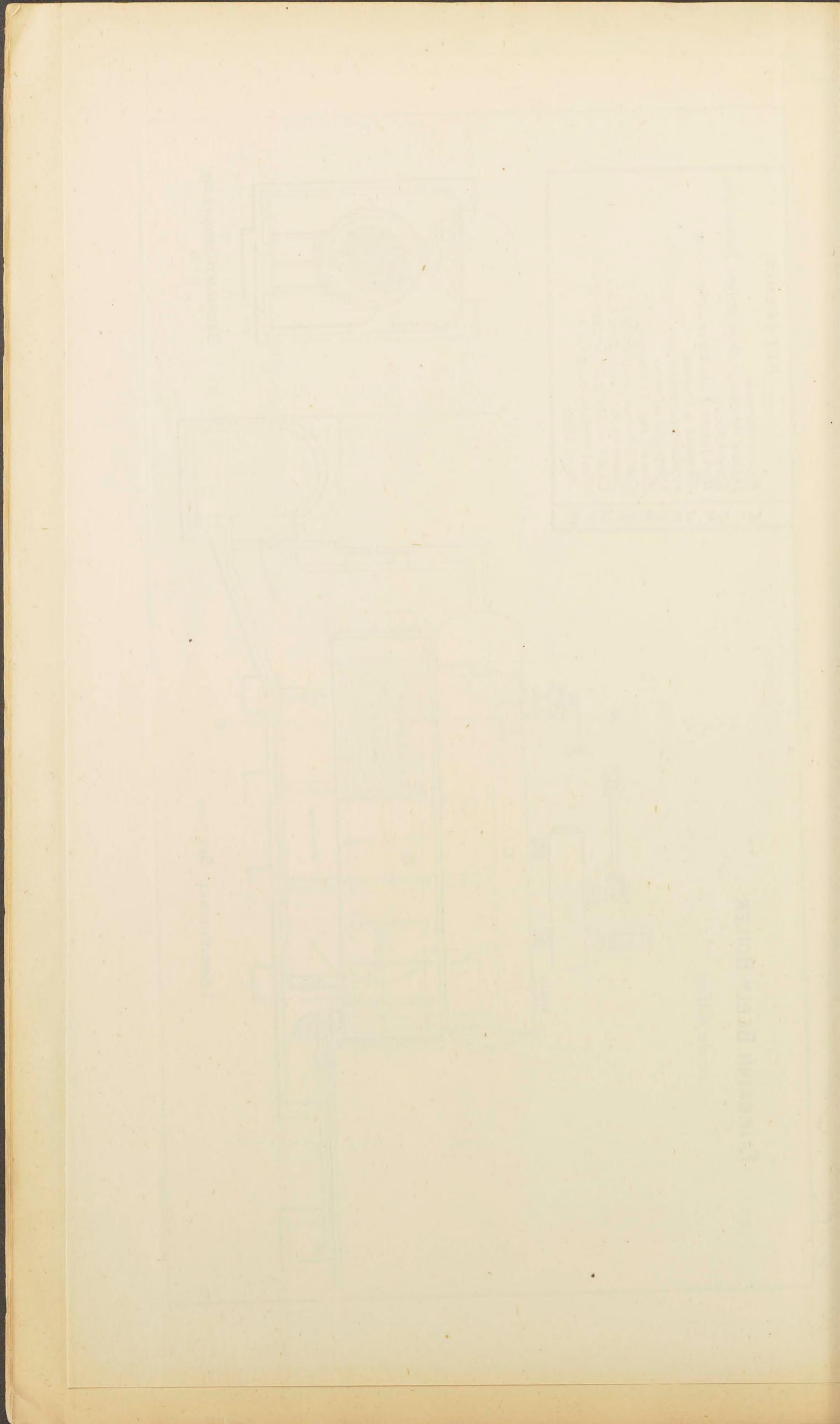
LONGITUDINAL SECTION

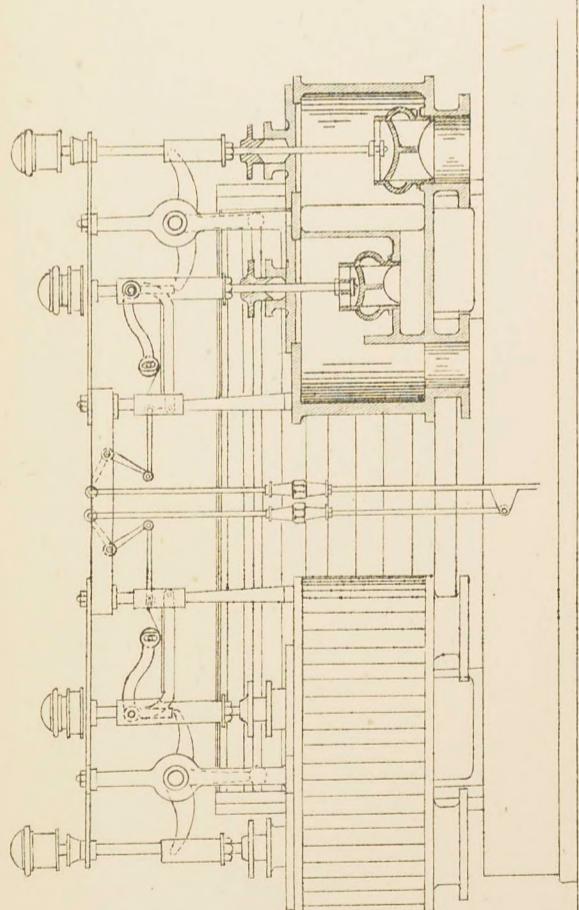
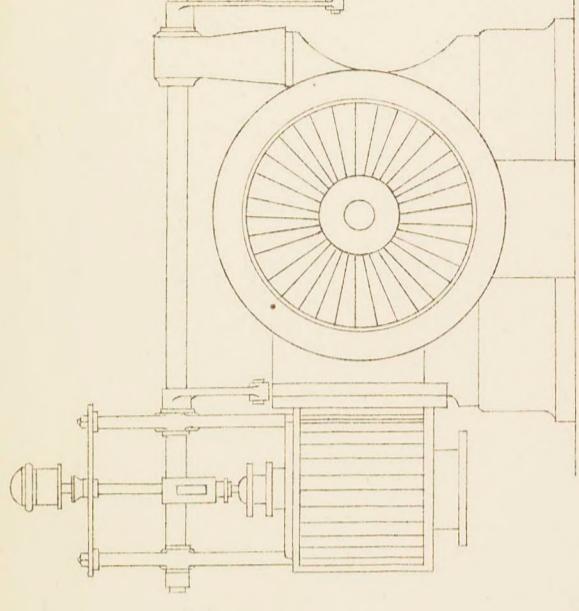
SECTION THROUGH LINE
A - B

REFERENCE

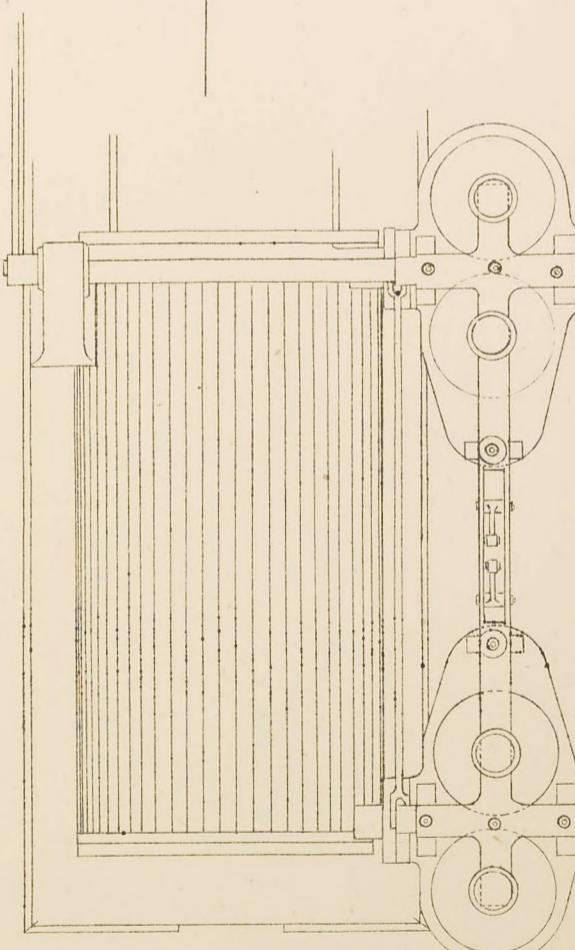
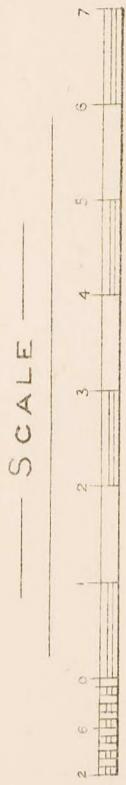
| | |
|---|--|
| E | Round Manhole |
| F | Double Pendulous Dead weight Safety Valve |
| G | Steam Nozzle |
| H | High Steam & Low Water Safety Valve |
| J | Dampers & Frames |
| K | Firefront, doors, bars, & bearers complete |
| L | Floor plates & Frames |
| M | Blow off tap & Elbow pipe |
| N | Chains for carrying Boilers |
| O | Smoke box for cleaning the Tubes |
| P | Cast Iron Blocks for protecting Bolts |
| Q | Sheet iron Circulating Pipes |
| R | Steam Dome |

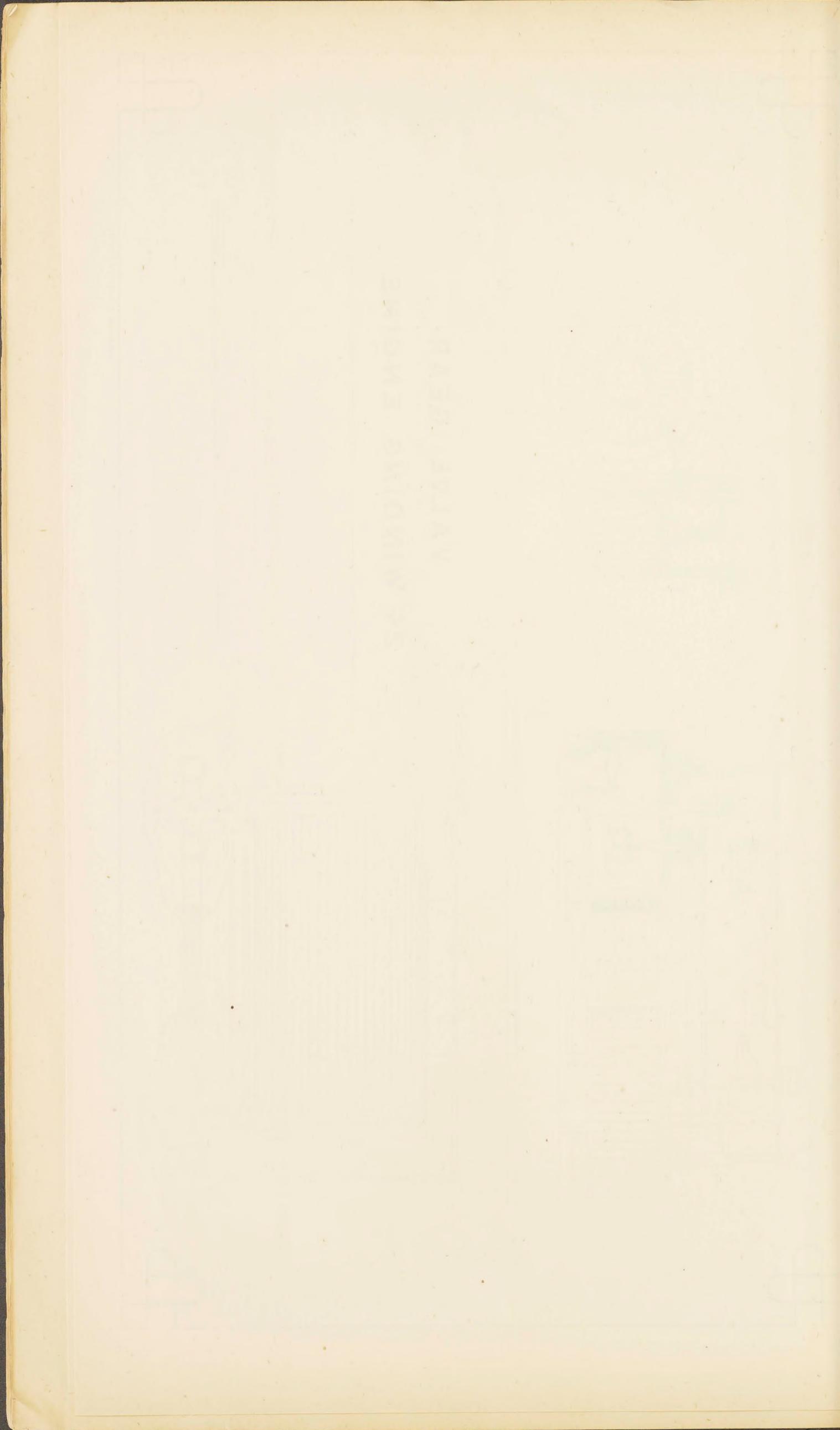






VALVE GEAR
24" WINDING ENGINE



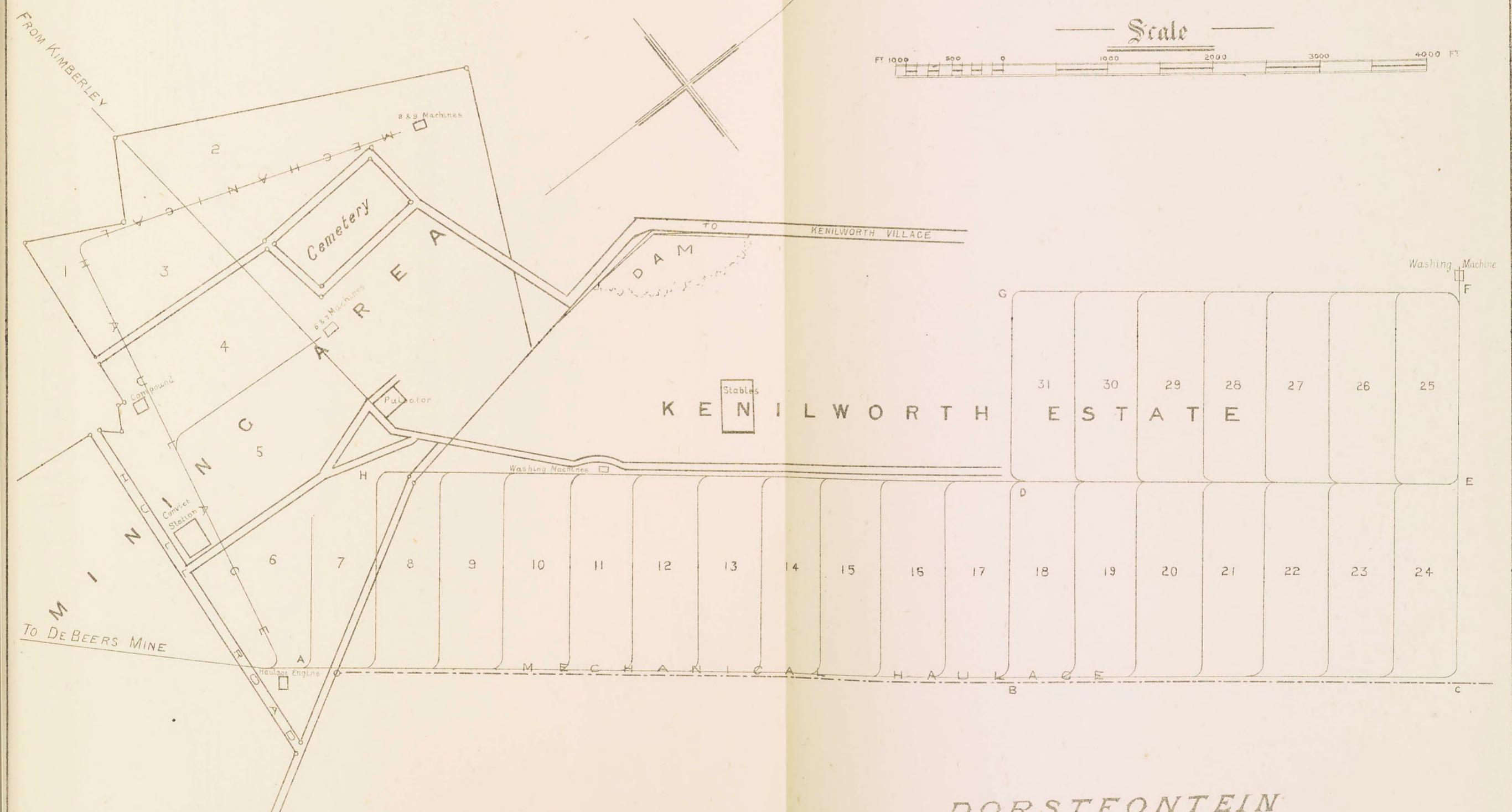


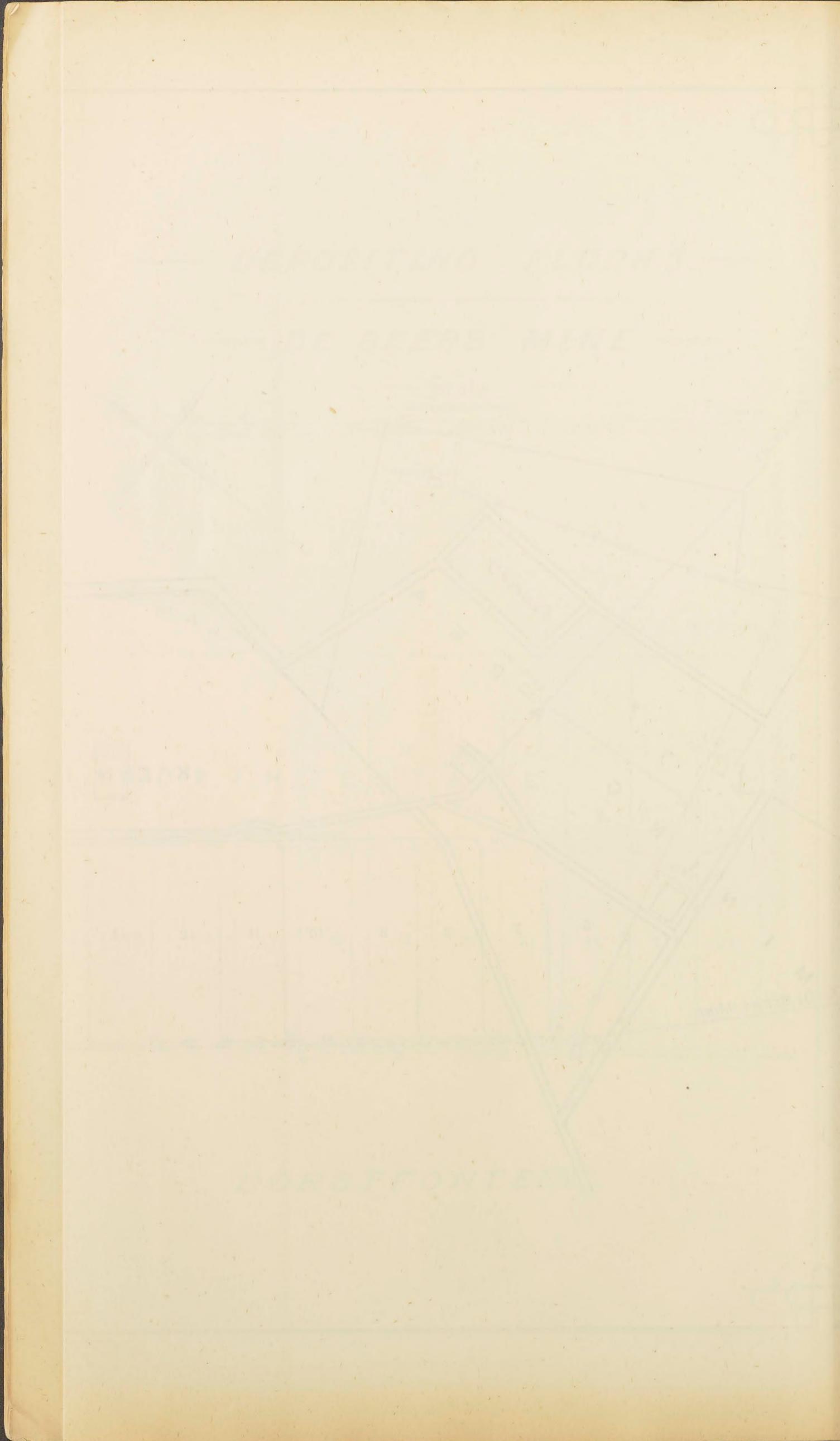
— DEPOSITING FLOORS —

— DE BEERS MINE —

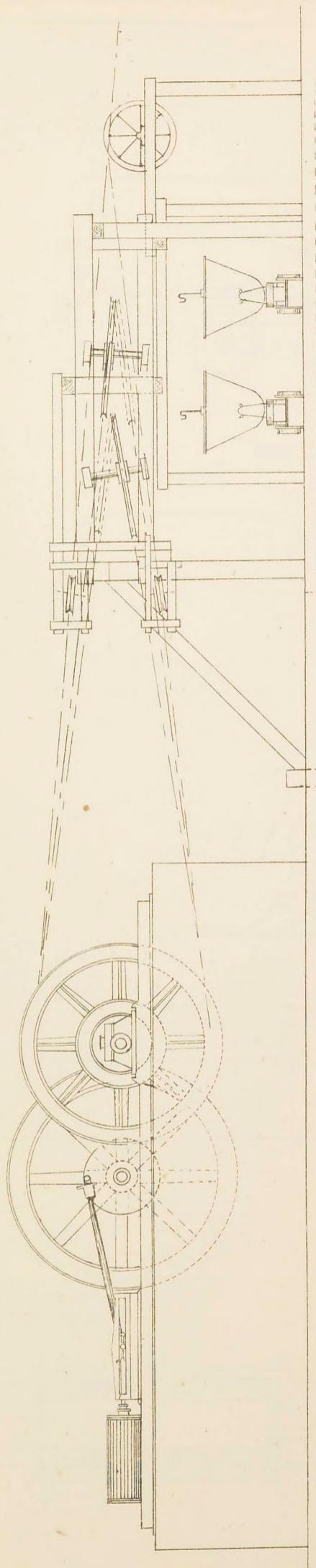
Scale

FT 1000 500 0 1000 2000 3000 4000 FT





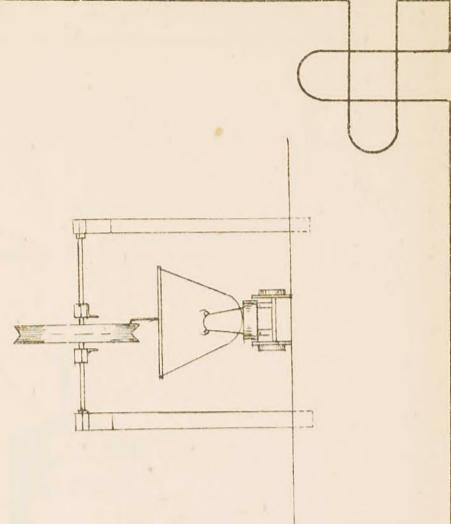
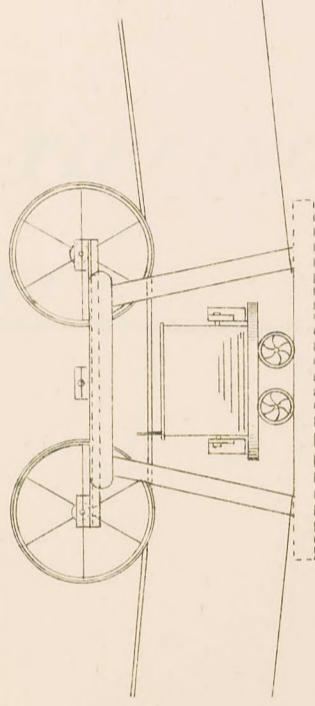
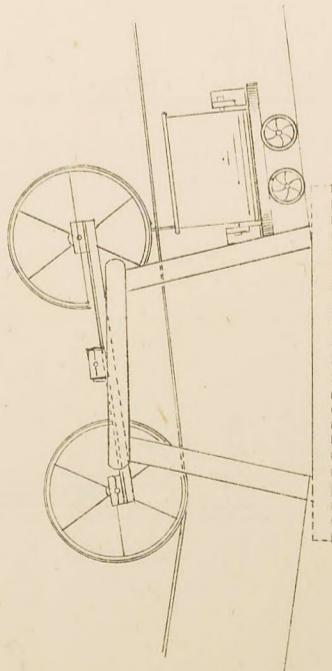
HAULAGE ENGINE



ROPE DEPRESSING ARRANGEMENT

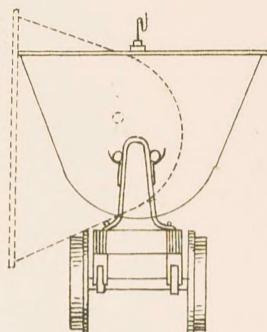
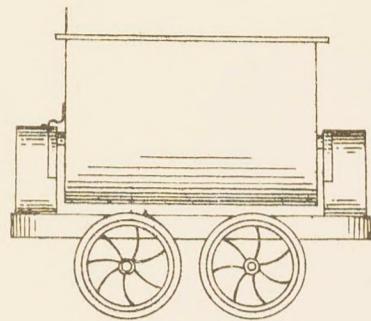
SCALE

1/2 0 1 2 3 4 5 6 7 8 9 10 11 12 FT



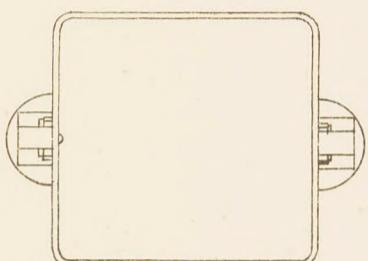
ARGUS CO LTD LITHOS

YOLBE DE BESSEMEUR



Scale

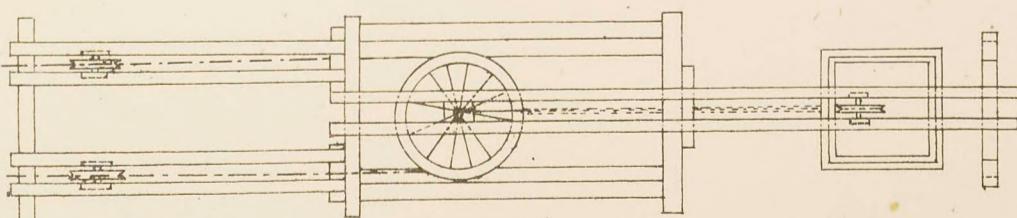
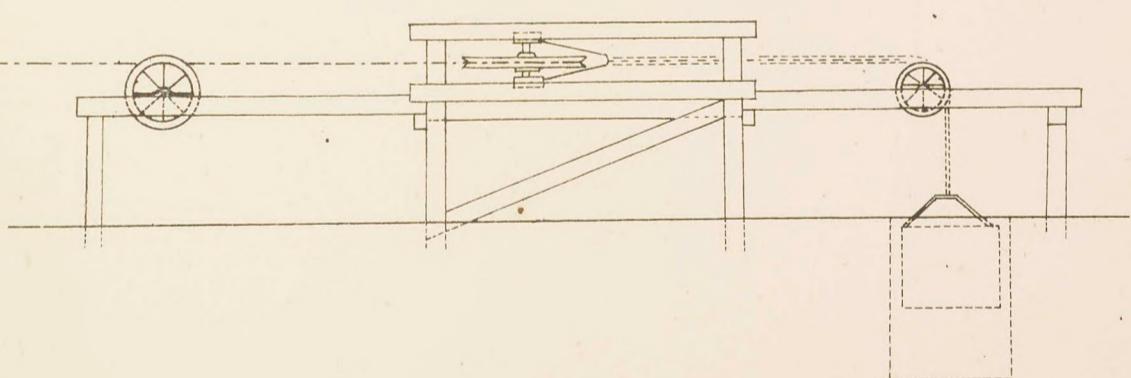
1/12 0 1 2 3 4 FT



—SIDE—TIPPING—

—TRUCK—

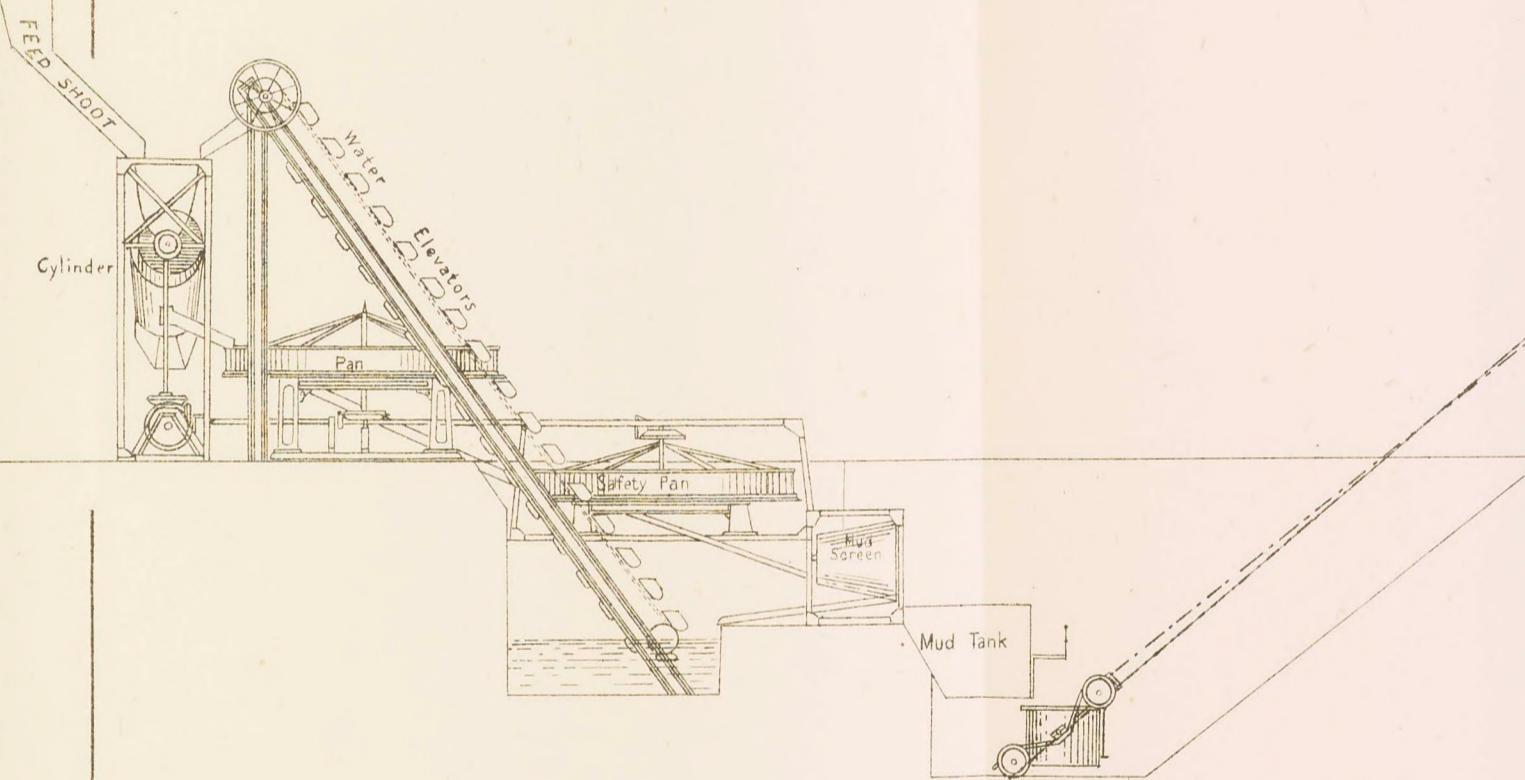
—TIGHTENING—

—FRAMES—

Scale

1/12 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 FT

DE BEERS CONSOLIDATED MINES LTD

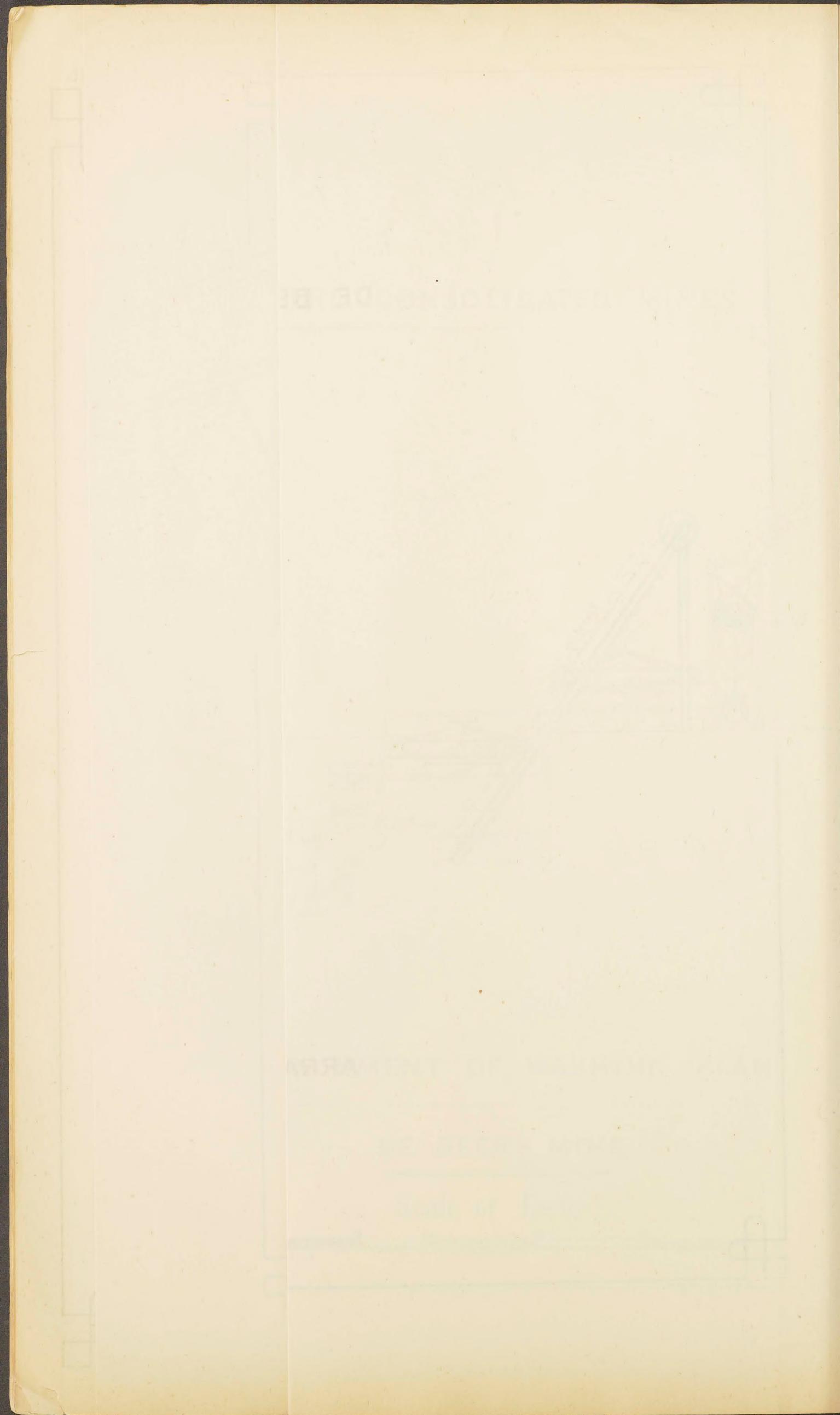


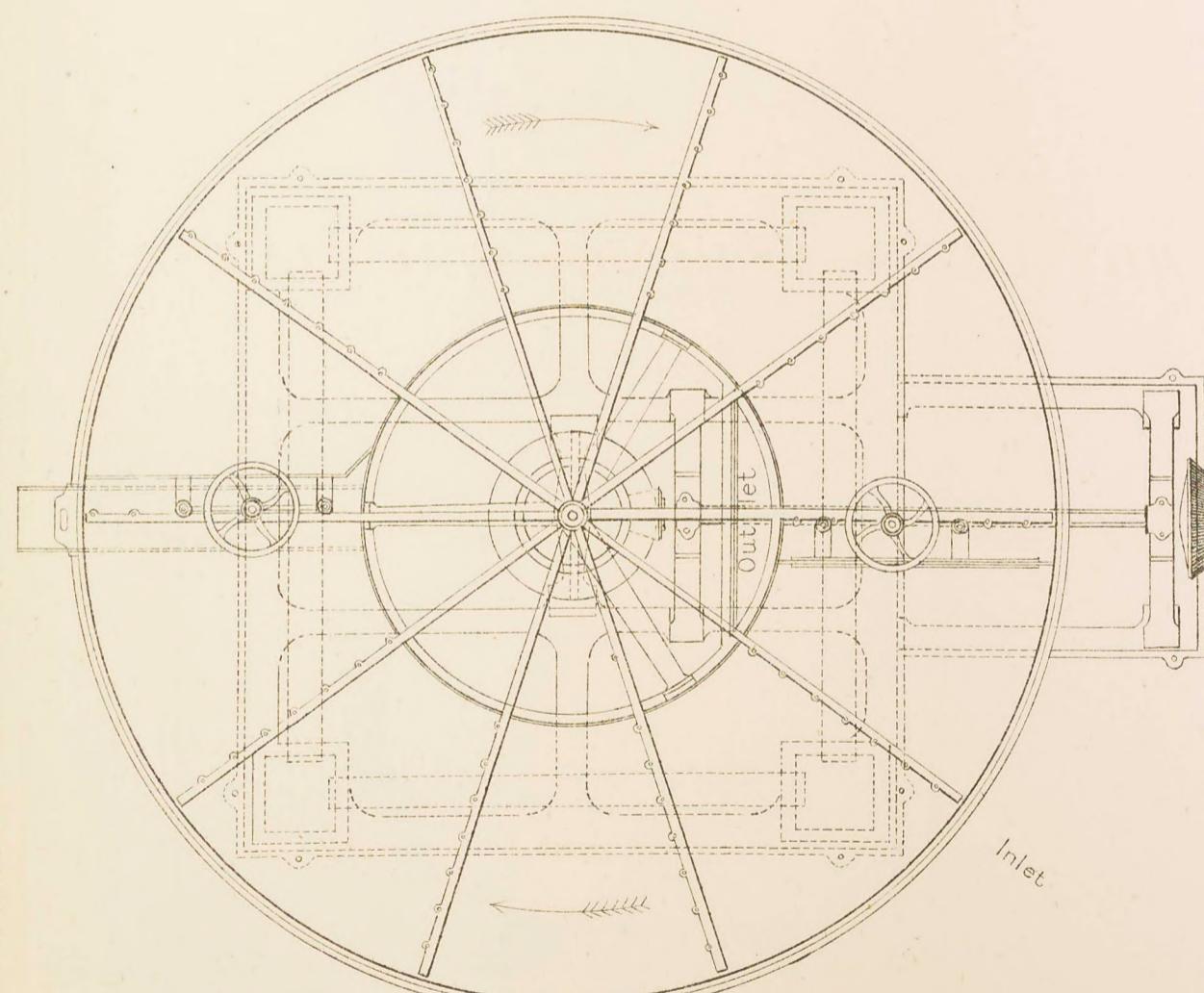
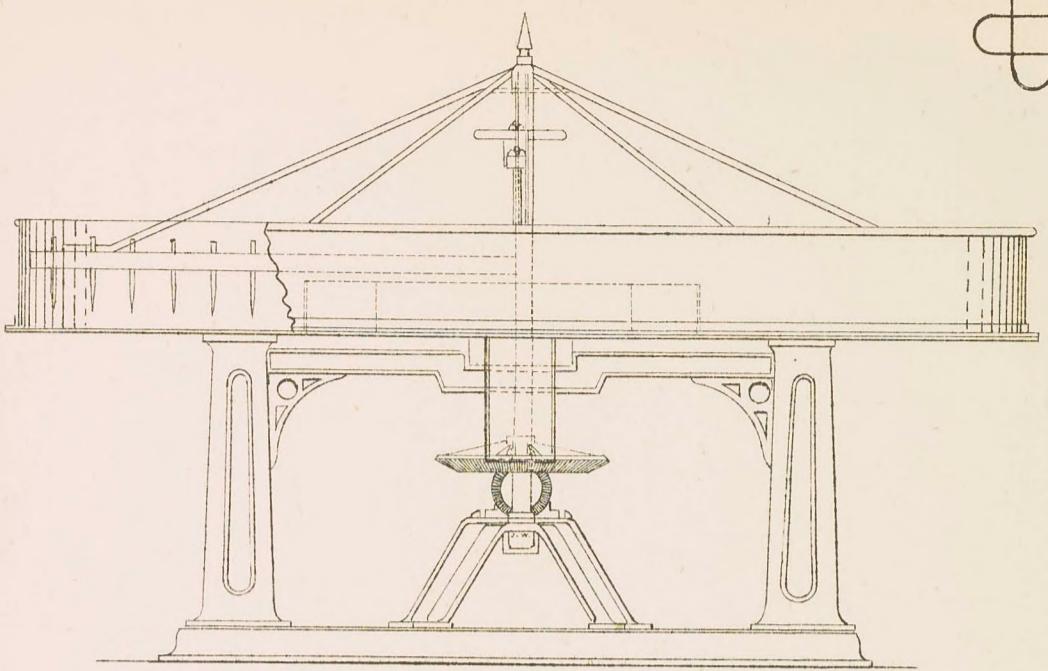
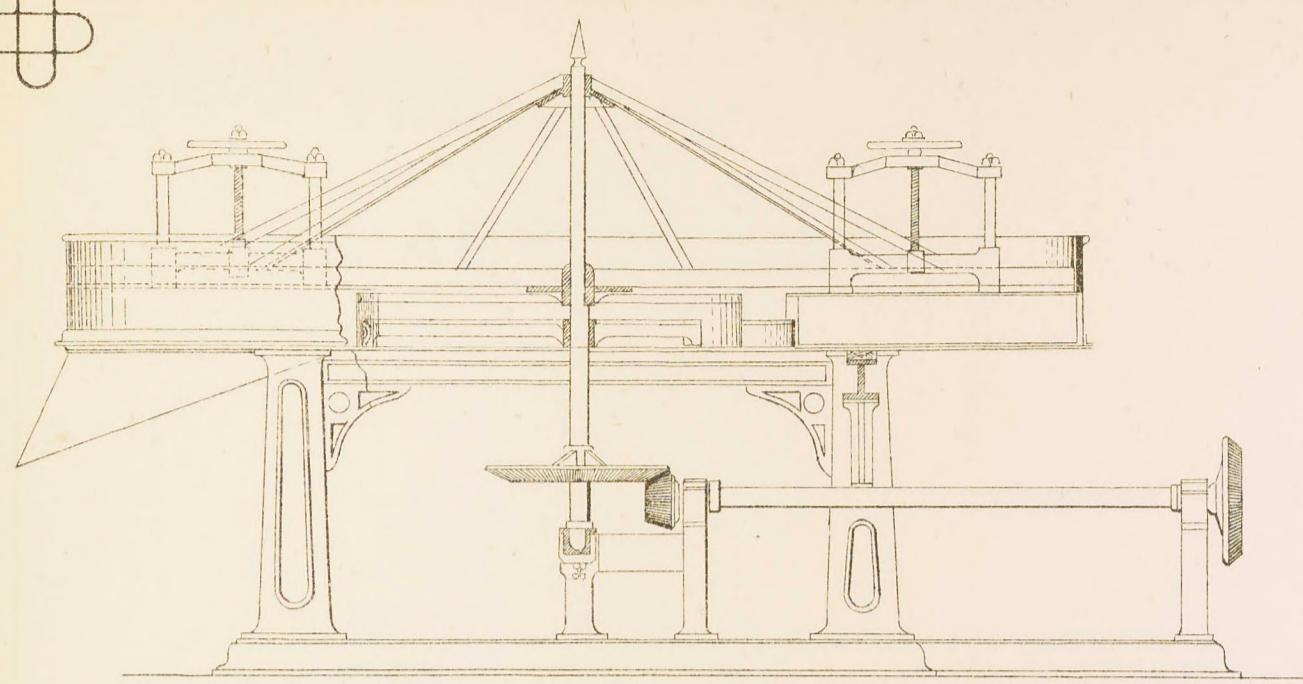
ARRANGEMENT OF WASHING PLANT

DE BEERS MINE.

Scale of Feet.

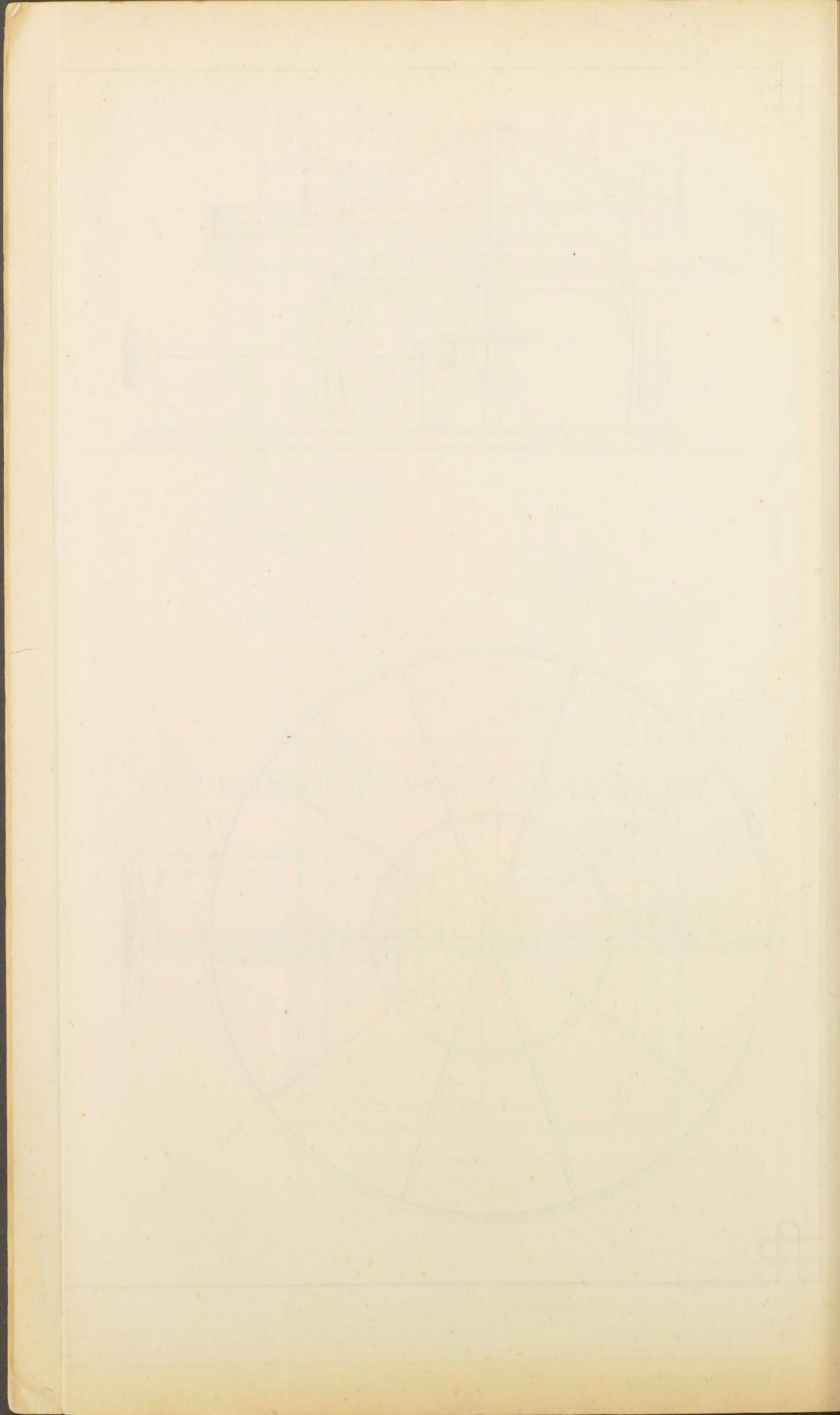






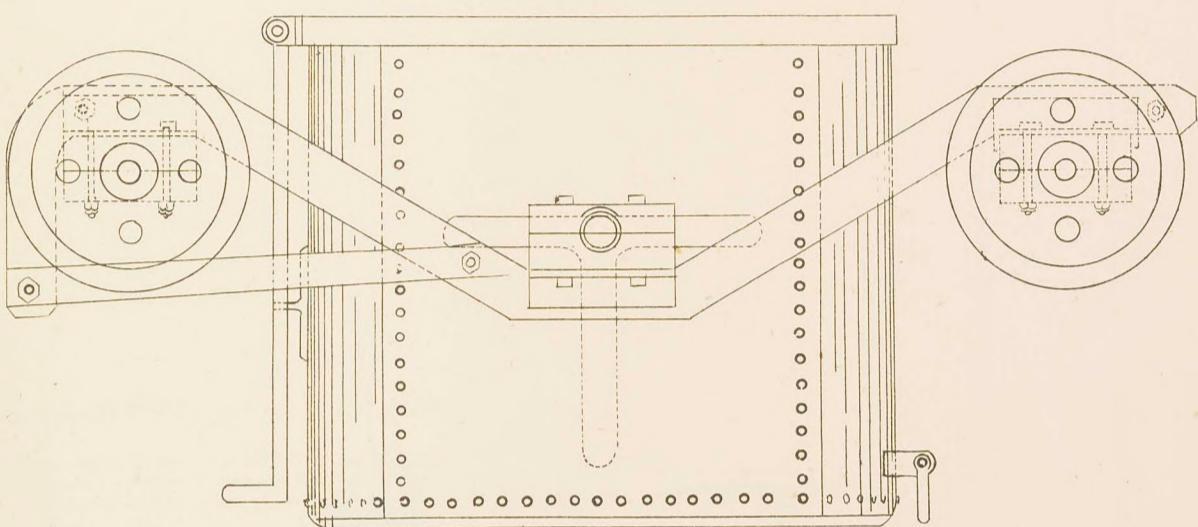
ROTARY WASHING MACHINE

SCALE 12 6 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

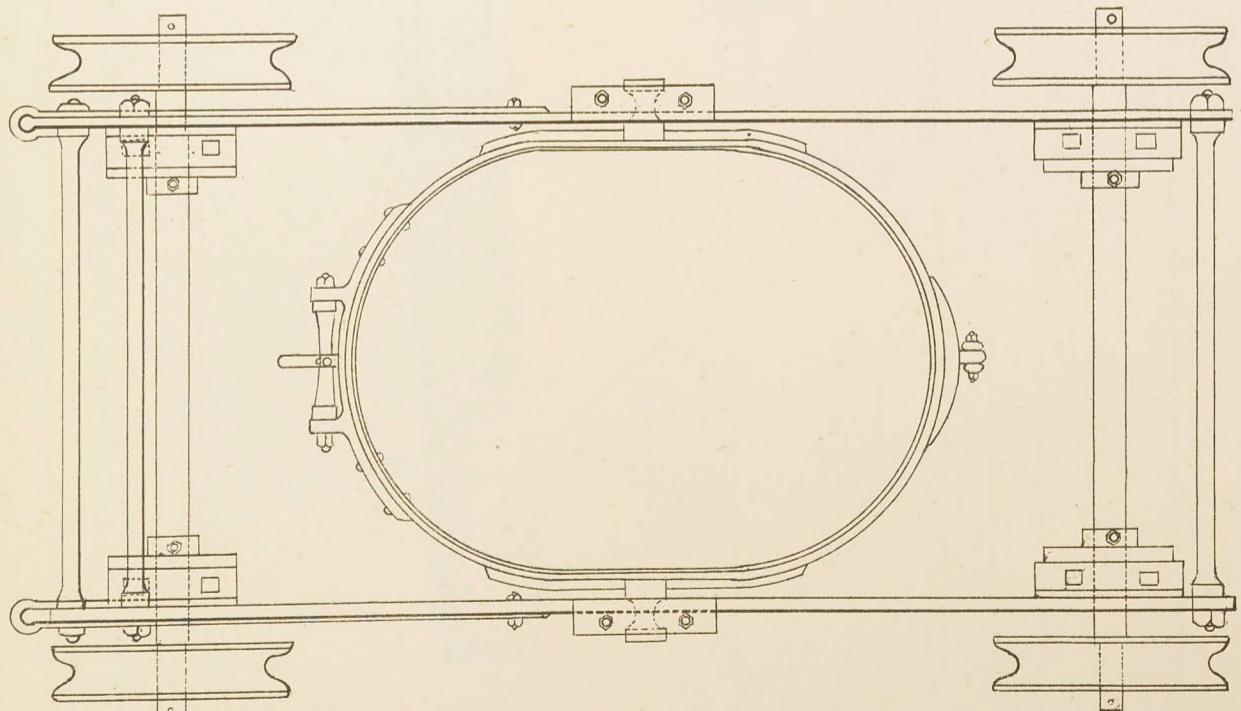


TUB & CARRIAGE FOR AERIAL GEAR

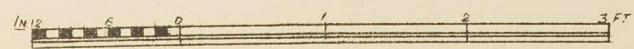
ELEVATION



PLAN



SCALE



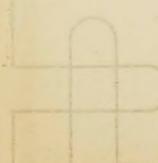
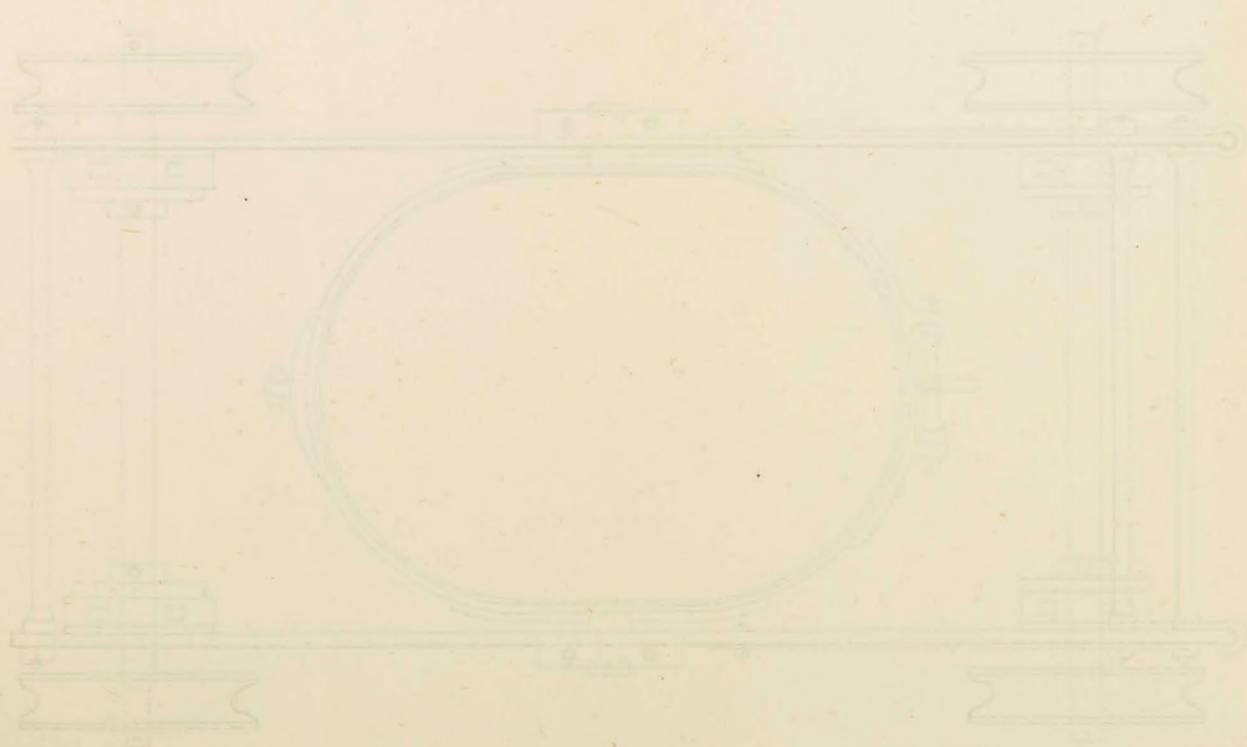
1874-1875

THE CARRIAGE

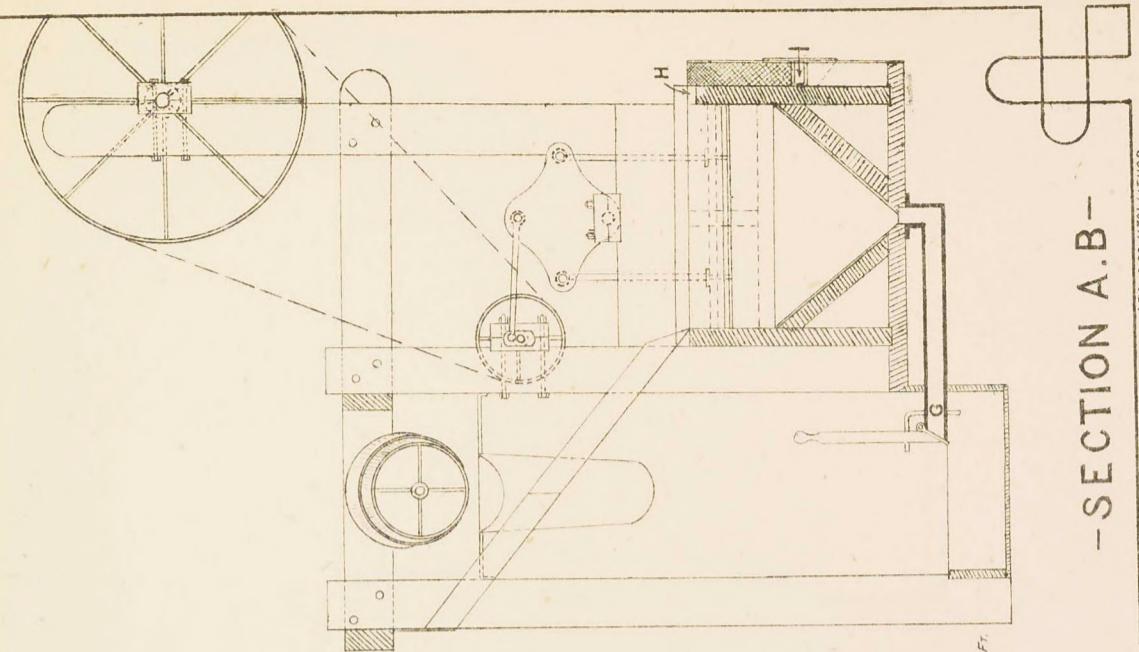
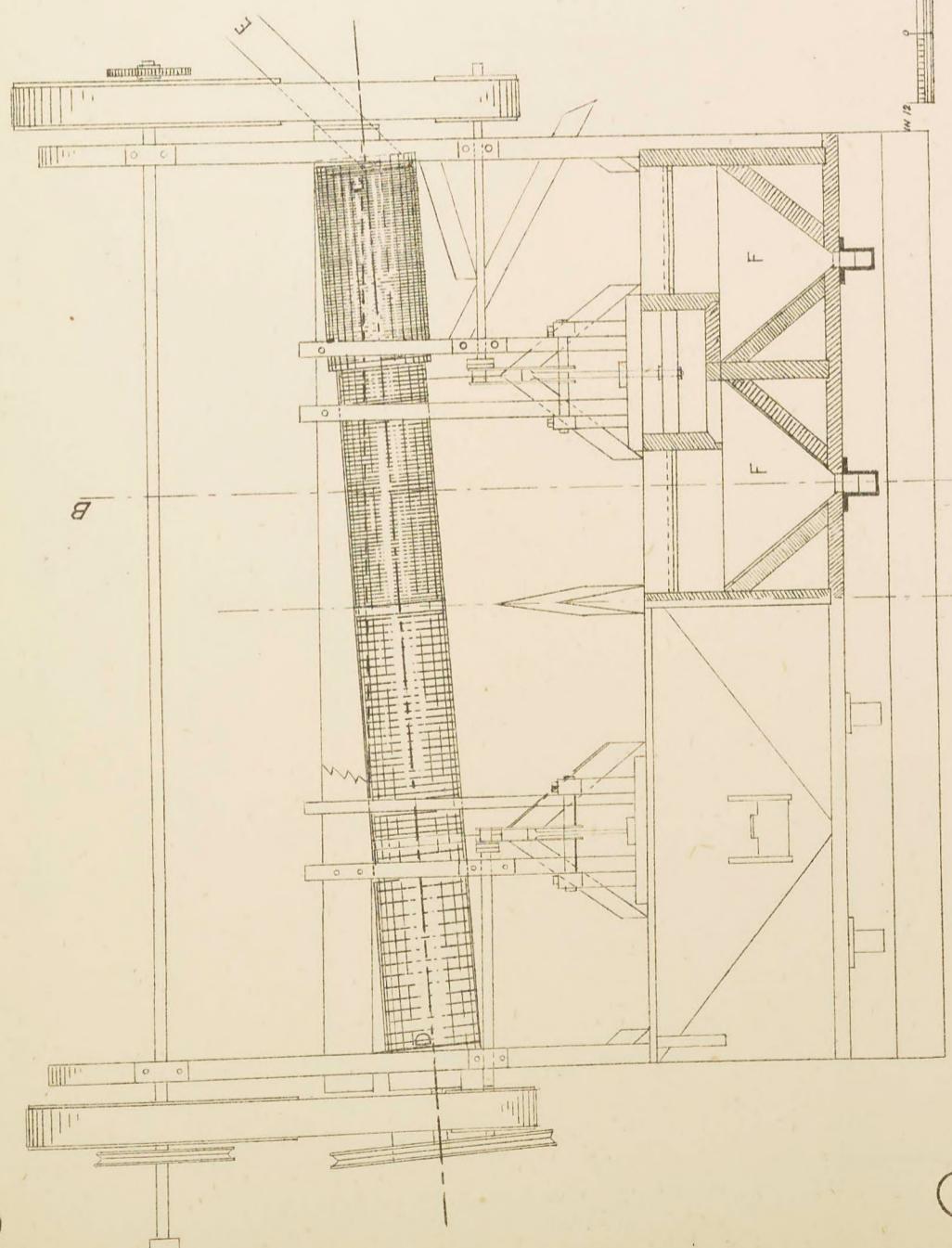
FOR

THE CARRIAGE

PLAN

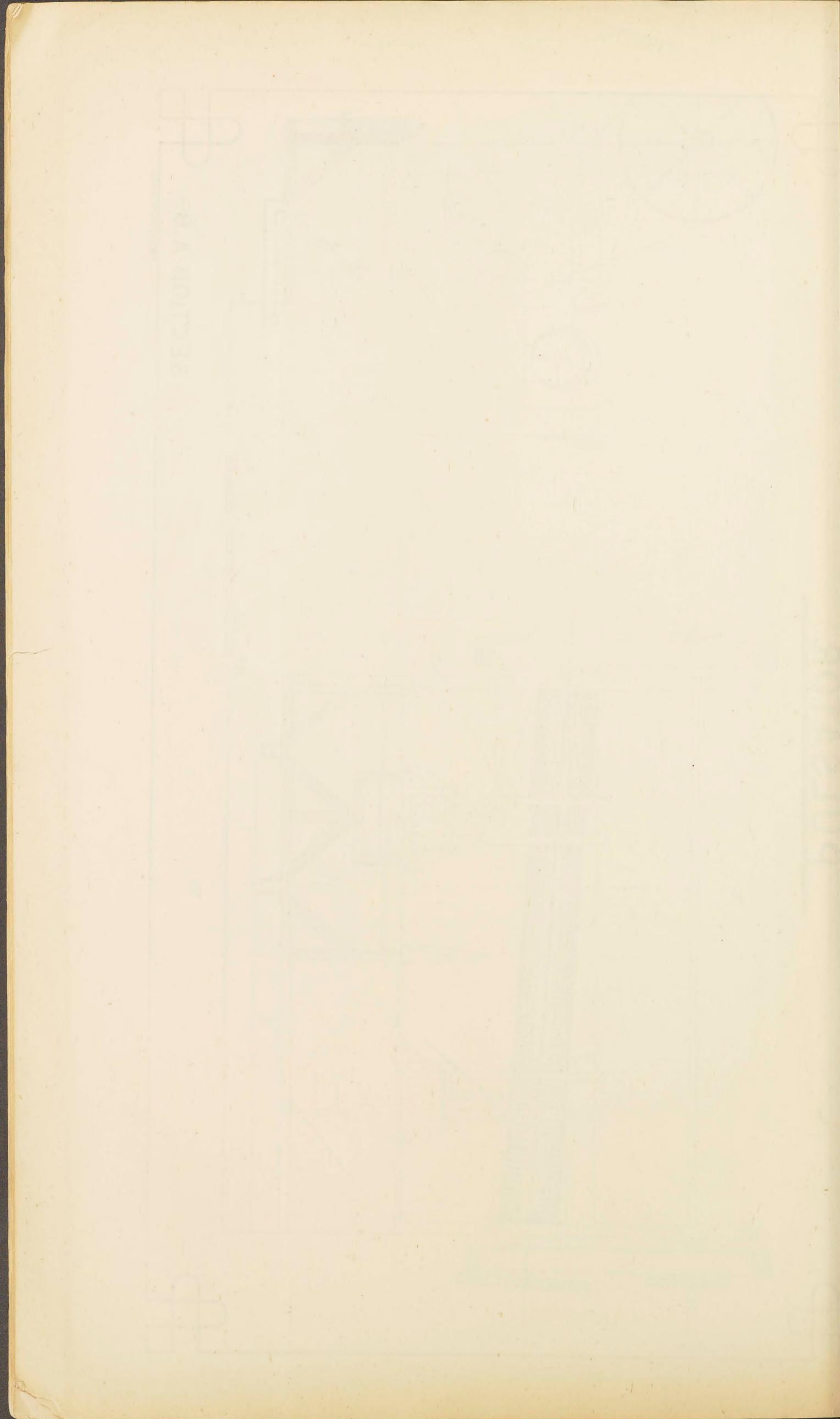


PULSATIOR



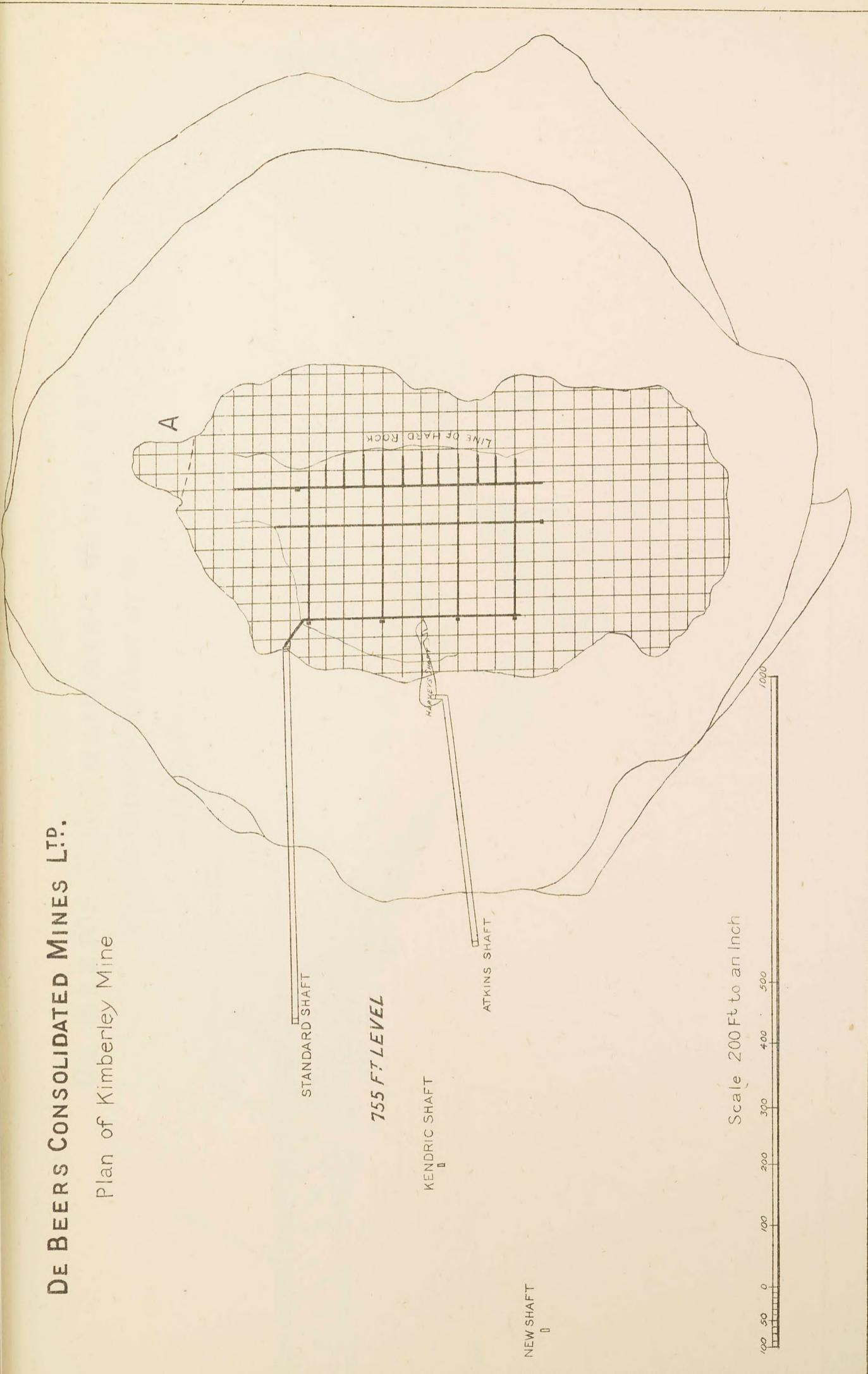
- SECTION A.B -

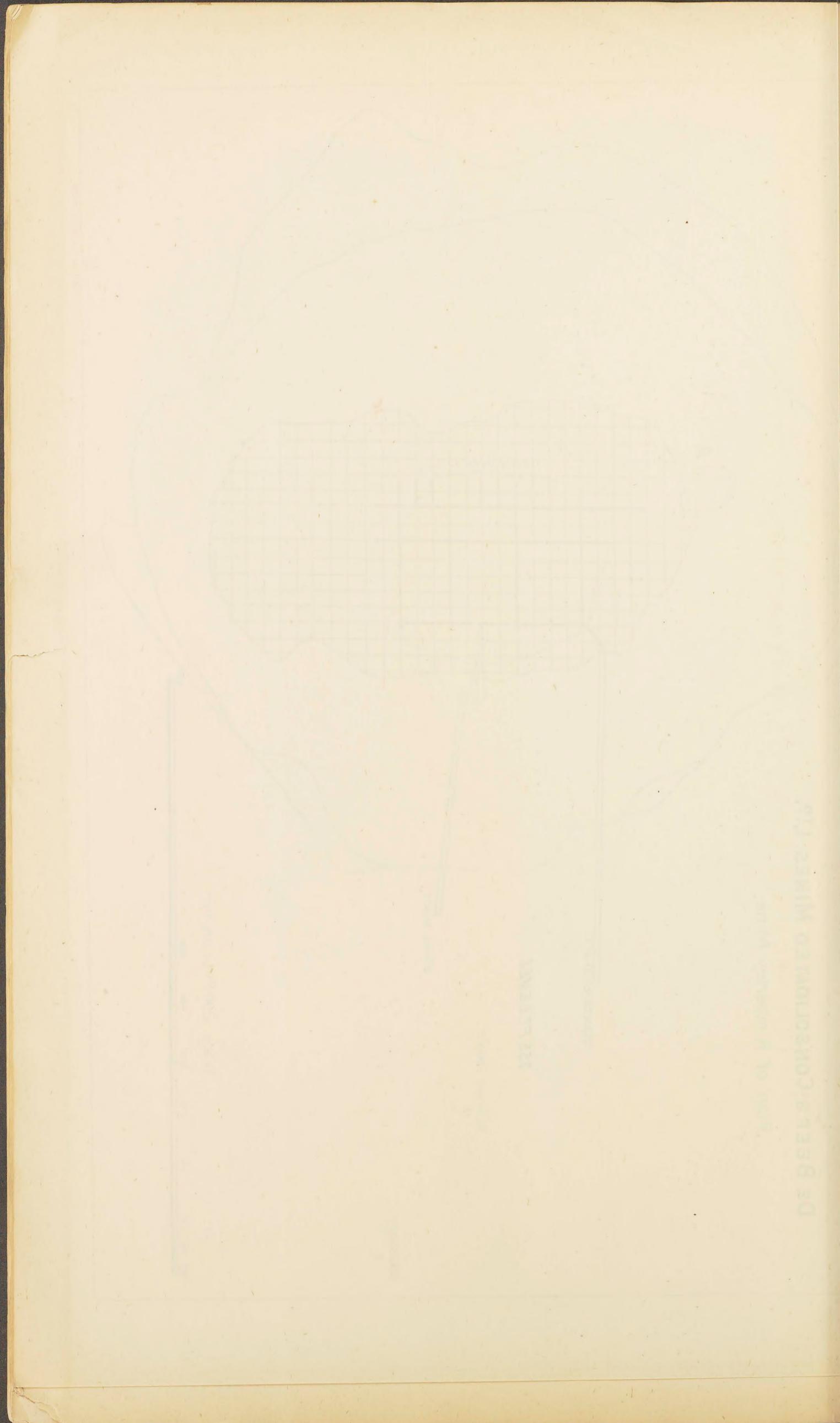
A. R. G. & CO. (LTD) LITHOS



DE BEERS CONSOLIDATED MINES LTD.

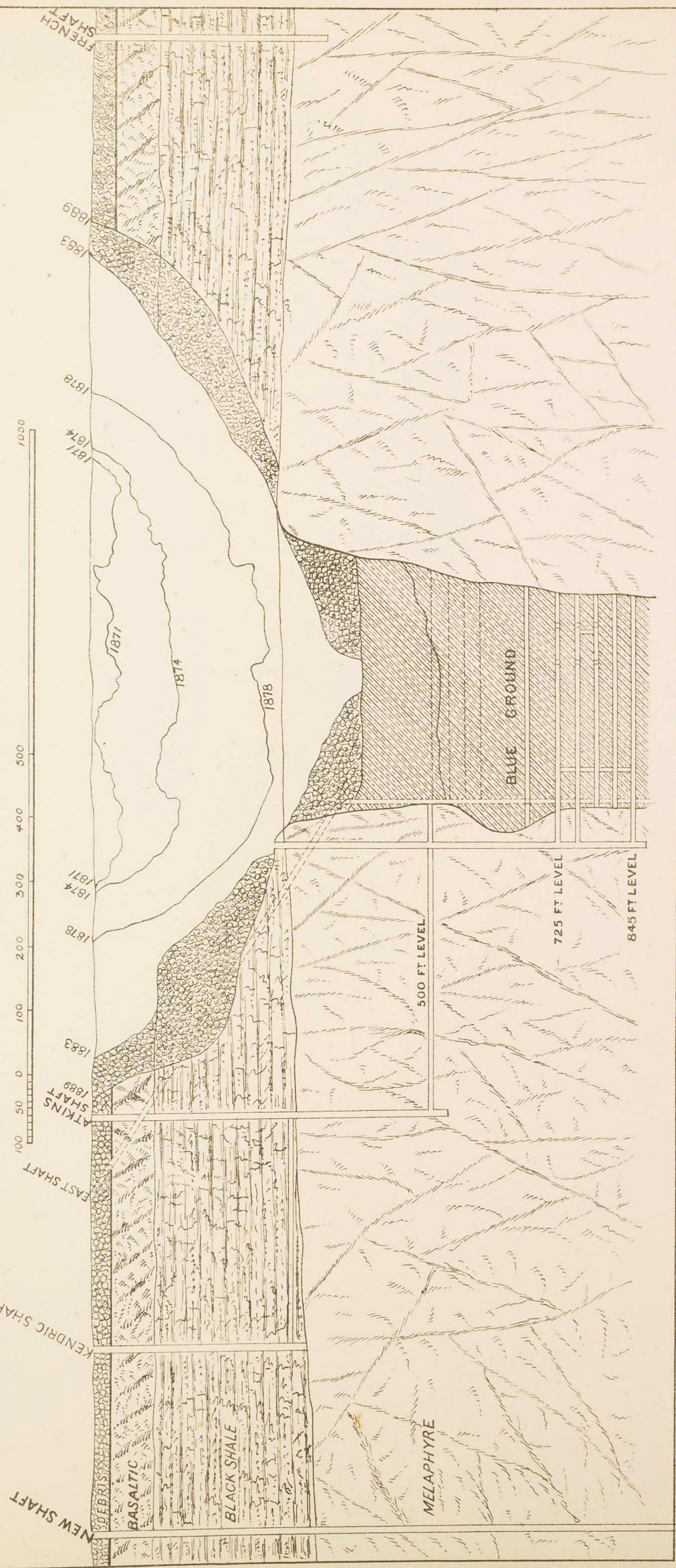
Plan of Kimberley Mine





DE BEER'S CONSOLIDATED MINES, LTD.
Section through Kimberley Mine

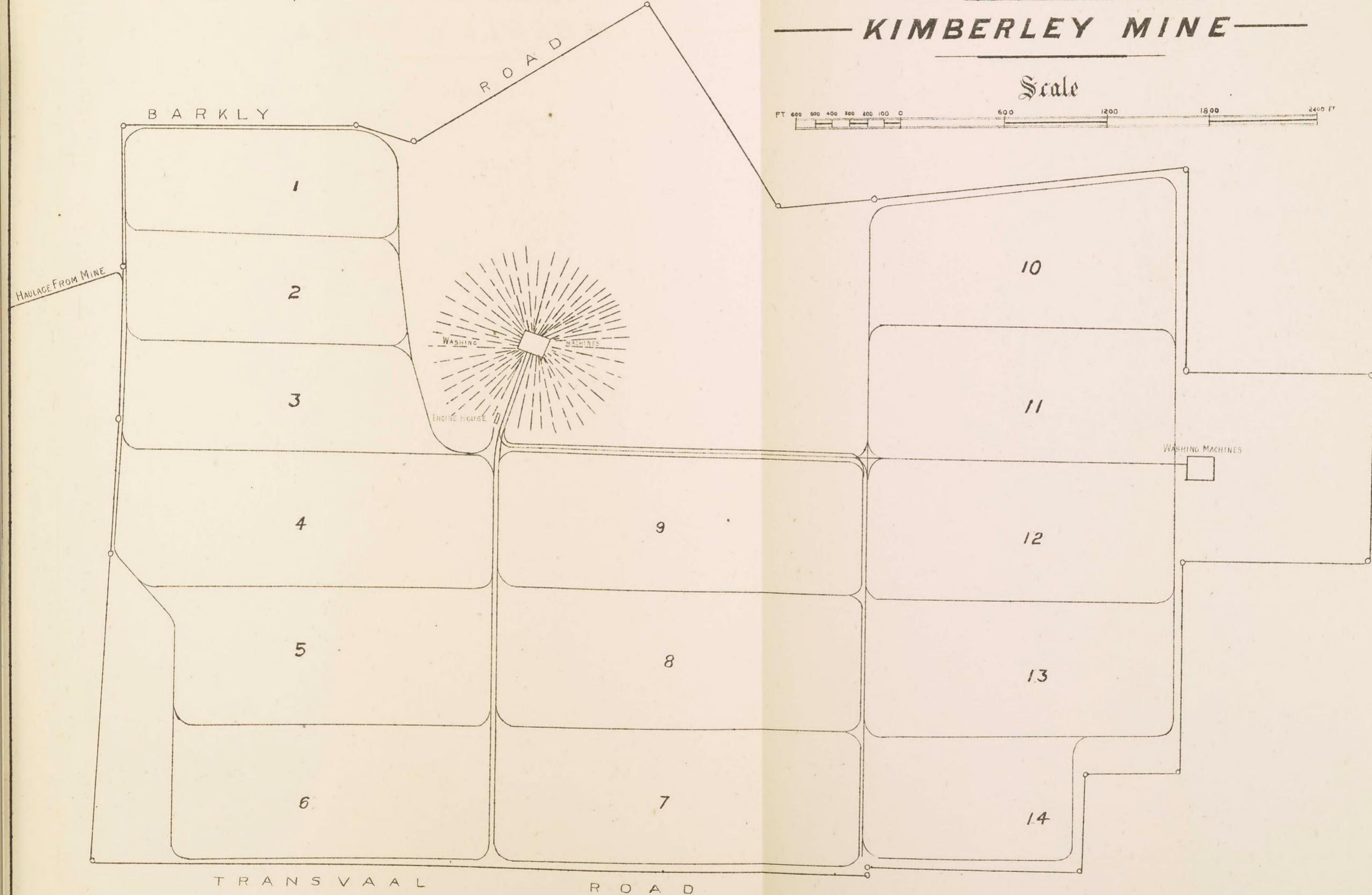
Scale 200 Ft. to an Inch

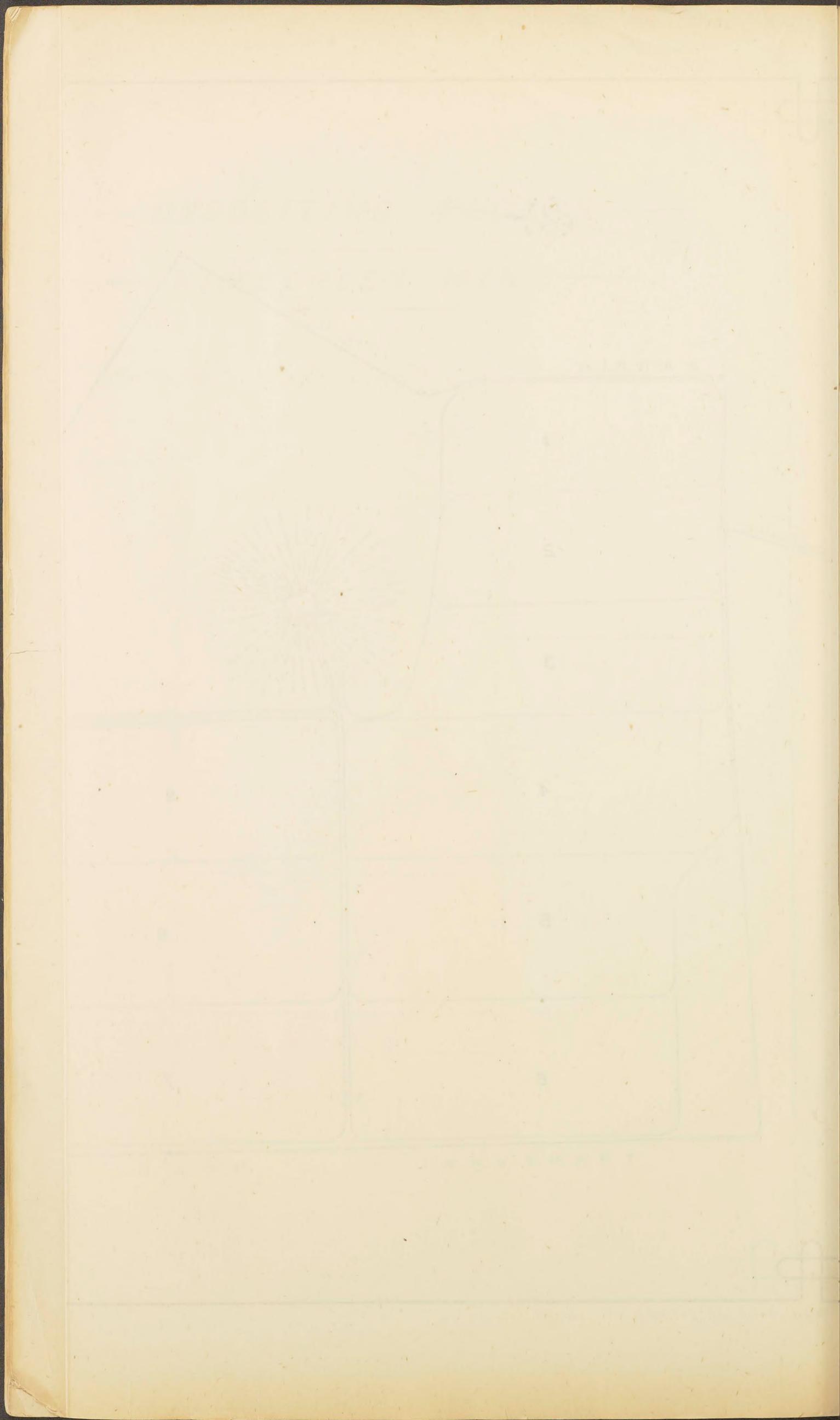


— DEPOSITING FLOORS —
— KIMBERLEY MINE —

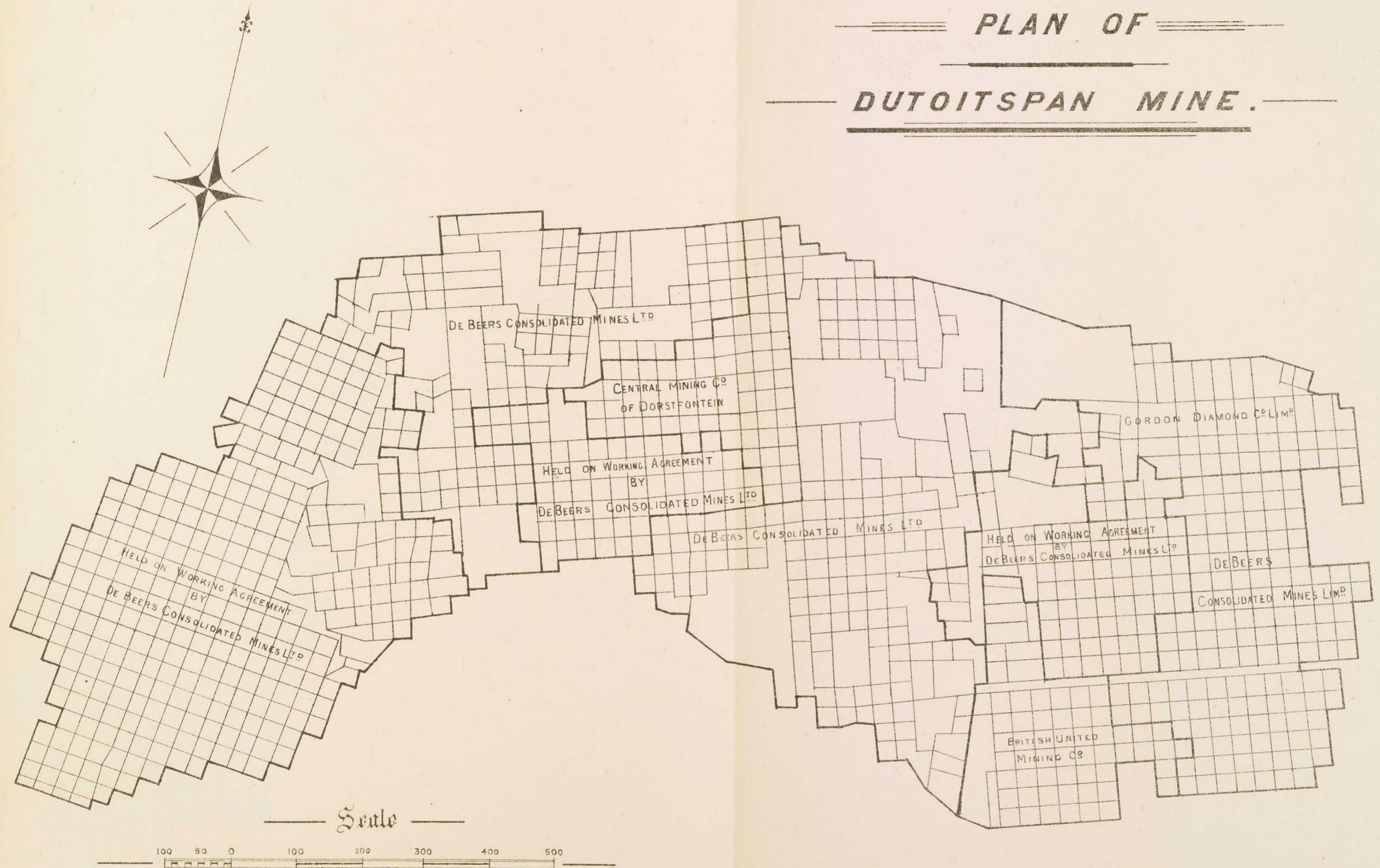
Scale

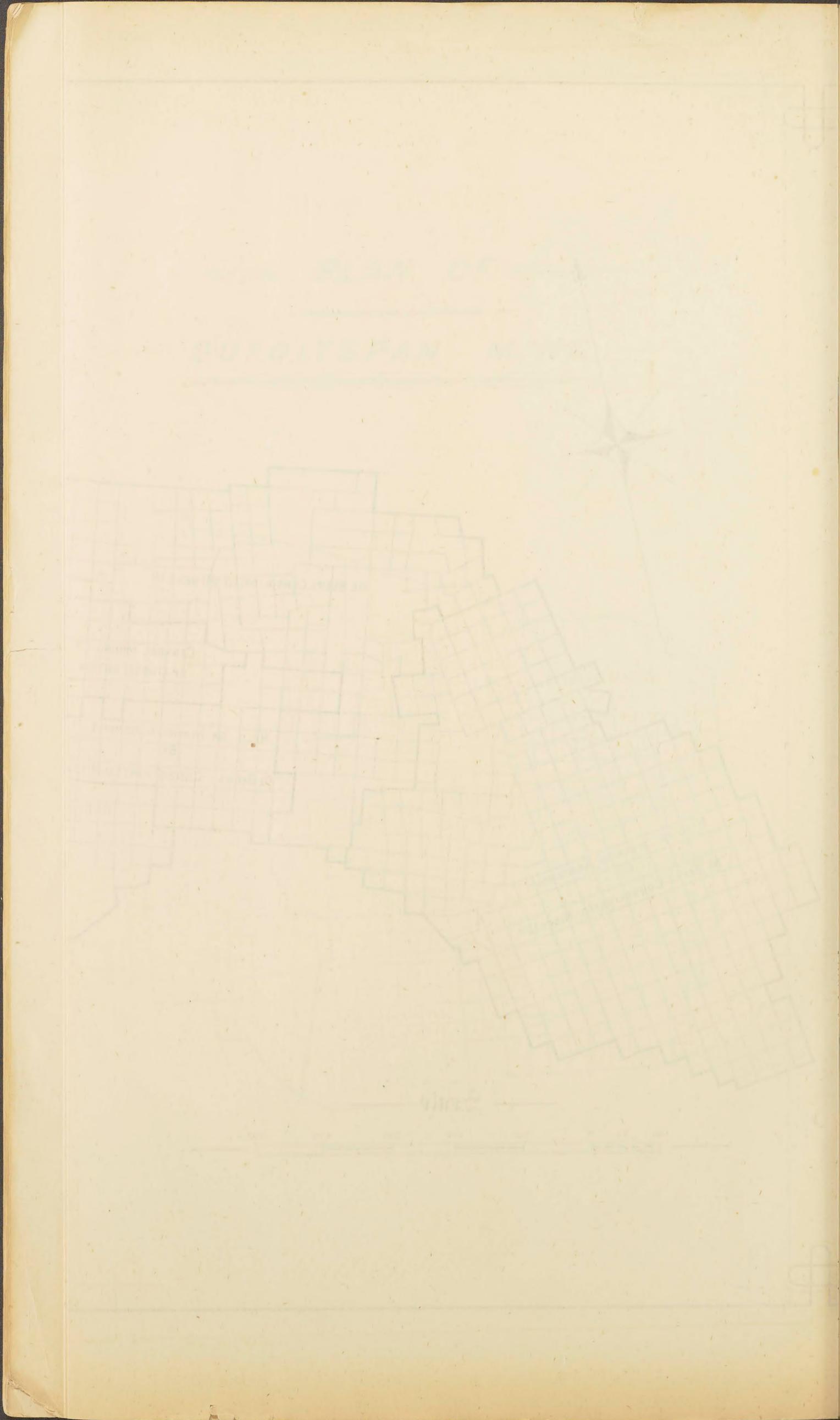
FT 600 600 400 300 200 100 0 600 1200 1800 2400 FT





— PLAN OF —
— DUTOITSPAN MINE. —





PLAN & SECTION
OF
BULTFONTEIN MINE

